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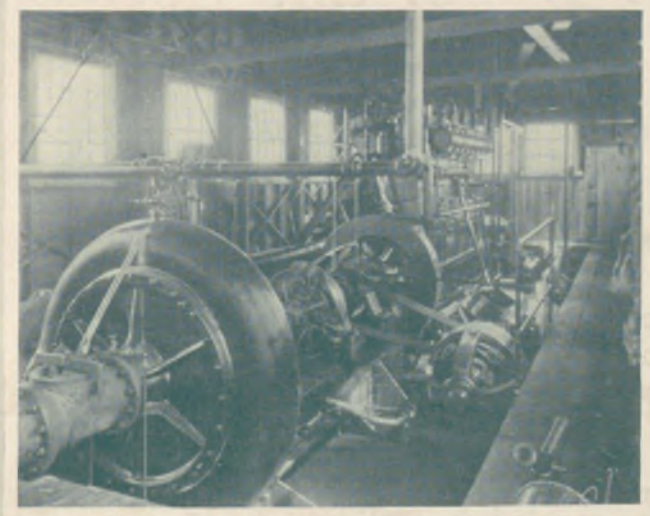
Dredging heavy blue clay and delivering half mile away at 25 cents per cu. yd.



THAT is the performance record of the 12-in. Hydraulic Dredge George Simons, Jr., in which the main pump is direct driven by 260-hp. McIntosh & Seymour Diesel Engine. Lighter material can be handled at 15 cts. per cu. yd.

These exceptionally low figures for such a small dredge and the steady high capacity, 80 to 100 cu. ft. per hour, with a crew of only five men have led the owner to characterize this outfit as "the best that money and technical brains can develop."

McINTOSH & SEYMOUR DIESEL ENGINES

McINTOSH & SEYMOUR CORPORATION
AUBURN, N. Y.

JUNE, 1927

PRICE 35c.

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Published on the 25th of the month prior to each title month of issue. Subscriptions: U. S. and Mexico, $4; other countries of the Postal Union, $5. Single copies, 35 cents. Bound volumes of 1926 and 1925, $10. Main Office: 220 West 42nd Street, New York.

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Volume XII June, 1927 *Number 6*

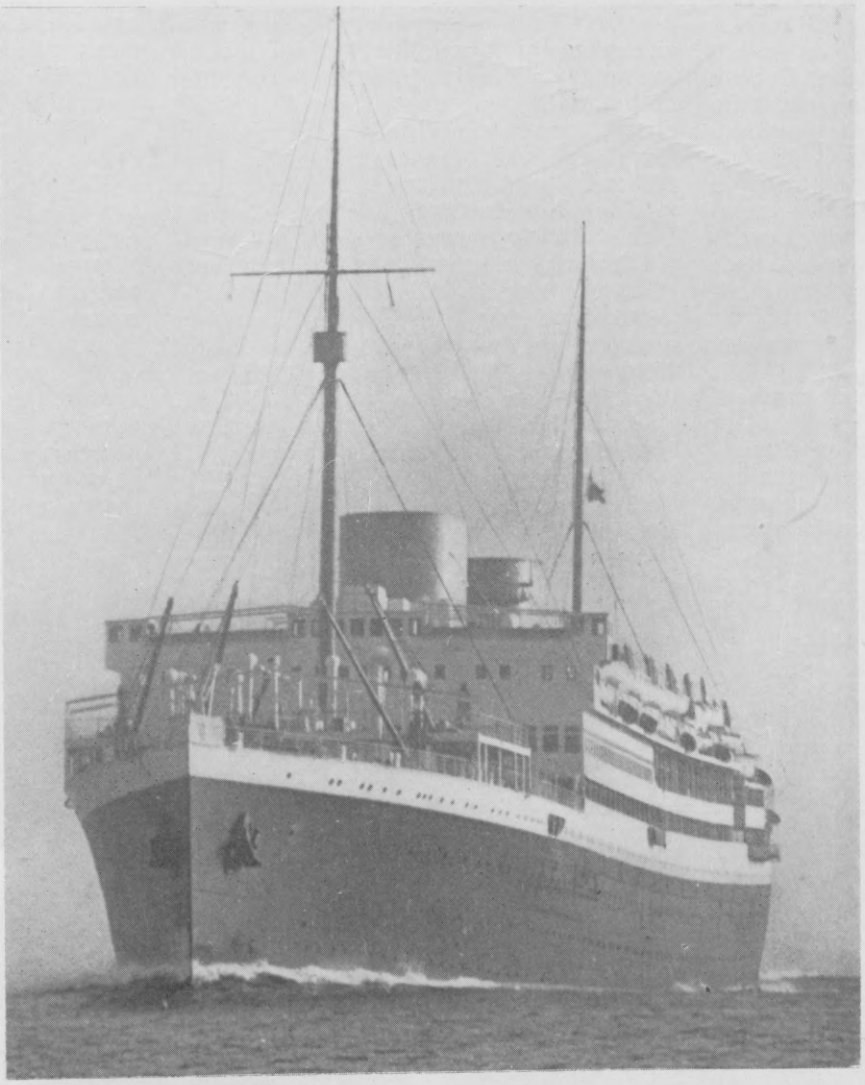
Motorshipping Marks New Era in Sea Transportation Business*

Study of Motor Passenger and Mail Liners Shows Designers Are Producing Big Double Acting Diesels for Powers Up to 30,000 hp. — Diesel-electric Propulsion May Solve the Problem of Super-powers

WHEN the White Star Line placed an order with the Harland and Wolff shipyards at Belfast, for a large motor passenger liner of what, for want of a better term, we may call ADRIATIC type, an epoch in motorshipping history was marked. This epoch was as important, almost, as that entered upon with the advent of AORANGI and GRIPSHOLM, first passenger and mail motorliners of large size. While these ships marked the commencement of fast passenger transportation by motorliner, the White Star liner marked the entry of the big motorliner into translantic trade between Great Britain and New York. The ship served as an indication that one of the biggest shipowning companies in transatlantic trade was definitely convinced as to the applicability of the Diesel engined ship for passenger carrying duties.

A number of factors enter into a study of high-class passenger motorliners which do not need to be considered where freight ships and intermediate passenger-cargo ships are concerned. The big high-class ship of about 27,000 gross tons and 20 knots speed and over is a very special problem in naval architecture and has requirements of design to be found on no other ship type except on certain small fast ships built for high speed runs on frequent schedule across the English Channel and the North Sea.

One of the big problems confronting the marine Diesel engine building industry at the present day is to provide oil engine power for the very big ship with high speed, requiring a large power within a small space, and to provide the small fast ship with a high power within what is, comparatively speaking, an infinitesimal space. This is likely to remain something of a problem for the next 5 or 10 years, and will depend in no small measure for its solution upon the ability of manufacturers to reduce weight per horsepower and to increase the power output per cylinder if a small number of large units is to be used. Alternatively there is Diesel-electric drive, which, in the opinion of many, will ultimately be the solution to all troubles.



Big motorliners of over 20,000 tons gross are revolutionizing passenger carrying

The ship type designated in general ocean parlance as the intermediate ship is no problem where Diesel powering is concerned and this remark applies equally to intermediate ships of all sizes. The first large ocean-going motorship—Ms. SELANDIA—was an intermediate passenger and freight carrying ship and there has been a continuous procession almost of similar ships ever since. The powering problems in such vessels are simple, ranging from 3,000 hp. to 15,000 hp. and having sizes up to about 10,000 tons dw. For these purposes there is a delightful range of arrangements and makes of engines to play around with. Single or twin screw layouts can, in the majority of cases, be adopted, passenger quarters conveniently placed amidships, and cargo holds on either side of the machinery space. Such ships are the designers' paradise, and the maker of Diesel engines can sell his standard size units, to the satisfaction of all concerned.

The type of ship we are mainly interested in discussing here, however — the large, high powered passenger ship—will always be a "custom made" job and will require special attention. A study of motor passenger liners falls under two main heads

* No. 2 of a series of specially prepared articles written for those who desire a concise summary of the motorship in relation to sea transportation.

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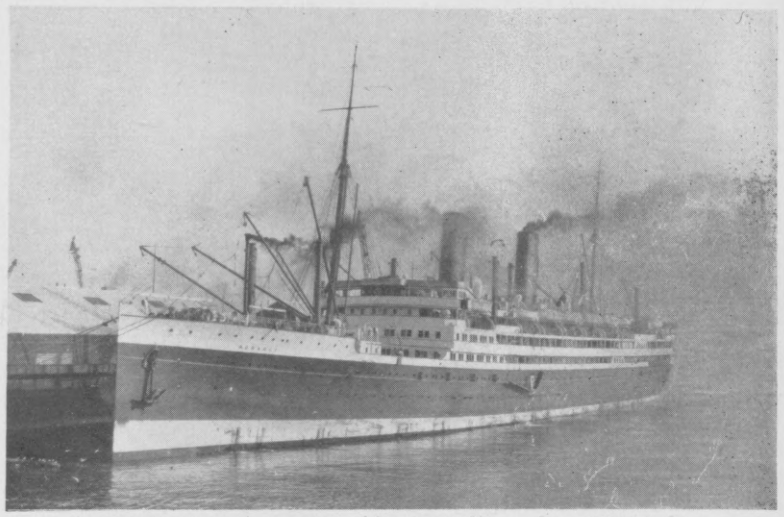
Gripsholm, pioneer transatlantic motorliner, has 16,500 *hp.*



Aorangi, pioneer transpacific motorliner, has 13,000 *hp.*

—a consideration of the way in which suitable powering may be carried out, and a survey of the improvements which the Diesel engine permits, in layout and in passenger comfort. In many instances the two are inter-related.

Fast passenger liners with up to 27,000 hp. on four shafts with double-acting 4-cycle and double-acting 2-cycle Diesels developing in the neighborhood of 1,000 hp. per cylinder have been planned and built. In the opinion of many people, 30,000 hp. is the maximum of power, within reasonable limits of space and weight, which can be obtained by double-acting engines connected direct to the propeller. This may be a matter of opinion and conjecture, but there is much to support the idea, if, with increase in power, these engines must increase in size, the dimension of prime importance being, of course, height. Excess of this latter is going to strike at the whole root idea of passenger carrier improvement which modern constructive thought is evolving. Indeed it seems perfectly logical to suggest that when we think in terms of very high powers 40,000 to 80,000 hp. we must not think in terms of the smallest number of large engines. Why not the largest practical number of small engines?

It is here perhaps necessary to state definitely that one has no intention of minimizing the value or the purpose of the big double-acting Diesel engine of either cycle. Rather is one indicating that, like everything in the marine world, its sphere of usefulness, though wide, is not limitless. The boundary line, it has been suggested, is in the region of 30,000 hp., at any rate for twin screws. How is this supported by fact?

A power plant of about 40,000 hp. suggested by the Cosulich line in 1926 for an express passenger and mail liner for Trieste —New York service, which was to give the ship a speed of about 23 knots, employed no less than eight single-acting 2-cycle engines connected tandem in pairs to four shafts.

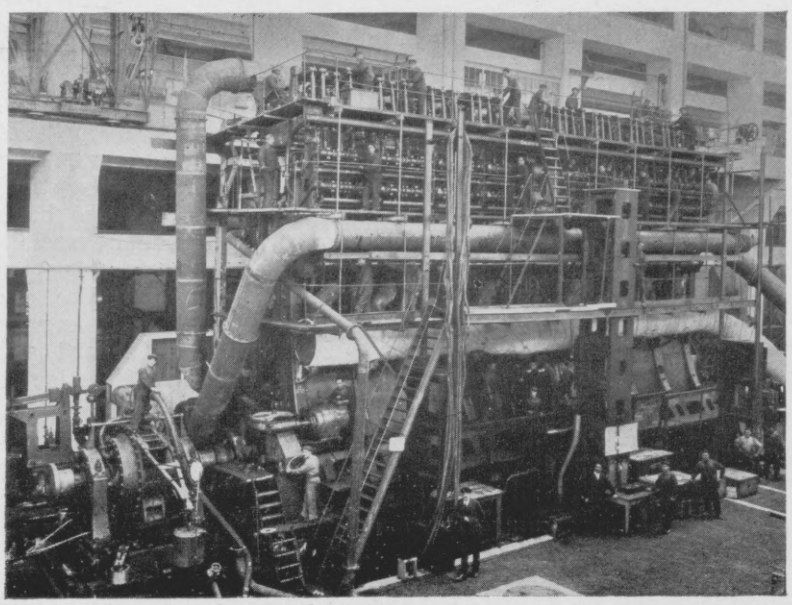
Each shaft in this arrangement is operated by two 10-cylinder, single-acting, 2-cycle Fiat Diesels, arranged in tandem and connected to each other by means of an hydraulic coupling, so that if necessary four of the eight main engines can be cut out almost instantaneously—in the event of, say, breakdown, or the desire to cruise economically at slow speeds. All auxiliary machinery is electrically driven. Cosulich Line definitely announced that they would use the single-acting, 2-cycle engine, because of its compactness and because it does not absorb much headroom, leaving clear deck spaces for passenger accommodation for 2,700 people—350 first-class, 450 second-class, 600 intermediate class, and 1,300 tourist cabin class. The crew numbers 500. The ship has a waterline length of 715 ft. and a gross tonnage of 33,000 tons.

The arrangement of accommodation offers many novel features, chief among which is that one complete deck is devoted exclusively to all the dining saloons and restaurants, with their respective galleys and pantries. The height between this "dining deck" and the deck next above is 11 ft. The topmost deck of all is a sports deck, containing a tennis court, bowling alley and other similar features.

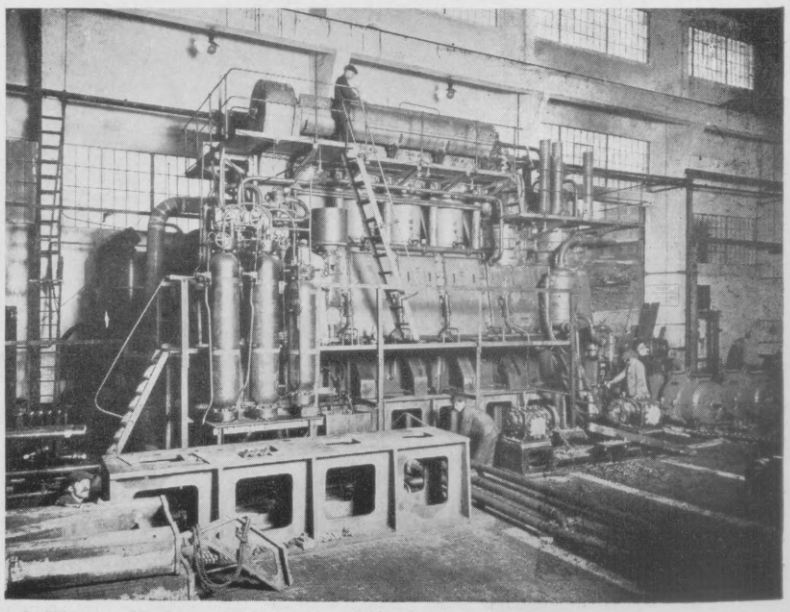
A 42,000 s.hp. power plant designed by the German Vulcan Werke for a 20 knot ship had no less than 16 prime movers driving 4 shafts, a link-up of four engines per shaft being adopted. These were short stroke, high speed, trunk piston Diesels and they drove their propellers through the medium of Vulcan-Foettinger hydraulic speed reduction and control clutches, by means of which all maneuvering was carried out. The engines themselves were of non-reversible type and drove all their own auxiliaries but not the auxiliaries necessary to the operation of the ship.

The Foettinger clutch, briefly described, has for its essential elements two rotors, somewhat similar to centrifugal pump rotors, one mounted on the driving shaft and the other on the driven shaft, with both rotors enclosed in a single casing. When this casing is filled with liquid, the rotation of the driving rotor projects the liquid against the blades of the driven rotor and causes it to rotate, in much the same manner that a turbine is driven. The amount of power transmitted is varied by altering the amount of liquid in the casing.

In this proposed layout, the power required is obtained in about the same floor



B. & W. 8-cylinder double-acting 4-cycle Diesel for motorliner Saturnia



B. & W. 4-cylinder single-acting Diesel for maneuvering air compressor

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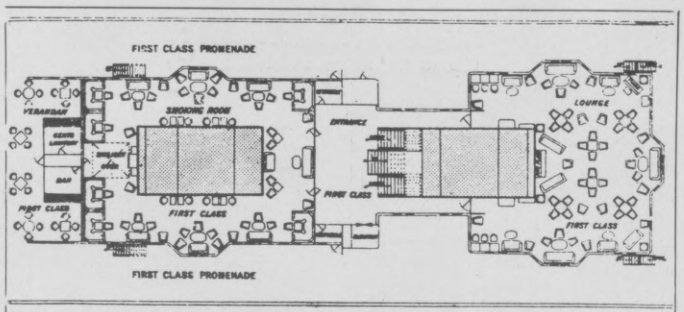
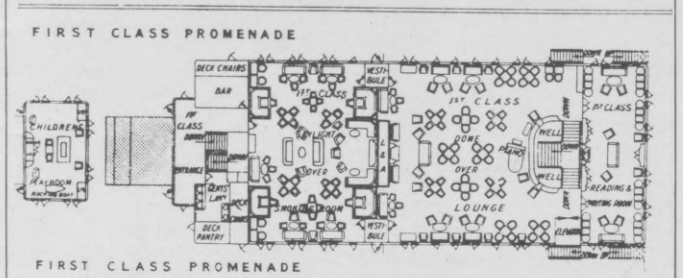
space as would be taken up by water tube boilers and geared turbines, with in addition less absorption of head room and much greater comfort to passengers owing to the absence of hot boiler uptakes. It permits, too, of improved interior decoration schemes because the passenger decks are mainly clear from side to side. The advantage of clear deck spaces obtained with Diesel engines of large double-acting type is well shown in the accompanying illustrations which show the social halls respectively of a turbine driven passenger liner of 30,000 hp. and a Diesel driven liner of about the same power. In the former much valuable space is absorbed by a large boiler uptake casing. In the latter, this is quite clear. In addition to which, there are no hot boiler casings in the passenger casings—a valuable asset for ships which have to spend a part of each voyage in tropical waters. The two ships cited above cross the equator on both outward and homeward trips. This is one of the superior features of the motor passenger liner, whatever her layout.



Steamer has obstructed lounge space



Motorliner has clear lounge space

The German arrangement mentioned above permits of centralized control but it does not eliminate the power generators required for the ships' auxiliary purposes. These, in a large ship, may become a serious factor as regards weight and space. Below 30,000 hp. they are large but not so large as to become unwieldy. Let us consider some existing cases and see what they amount to.

Auxiliary Powers for Passenger Motorliners

Ship	Aux. Sets	Power	Main Power	Remarks
	no.	kw.	hp.	
Aorangi	4	1200 total	13,000	2 Scotch boilers
Gripsholm	6	990	16,500	3 Comp. engines
Asturias	4.	1600	20,000	Hydraulic deck cranes
Augustus	8	3200	28,000	Includes 3 blower engines

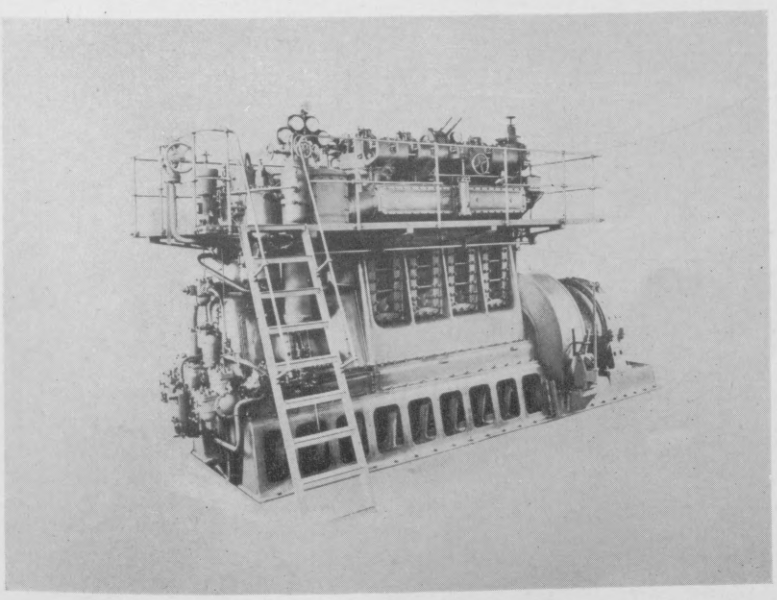
On Ms. Aorangi the auxiliary Diesel power is not so high proportionately as on later vessels. It is higher than that of the Gripsholm because electrically driven rotary blowers are used for main engine scanvenging. Gripsholm has double-acting 4-cycle Diesels. Aorangi was the pioneer big passenger motorliner and a large proportion of her auxiliary machinery, including the deck machinery, is steam driven. Such a layout is perhaps excusable in view of the pioneer nature of the ship, but it is entirely out of line with modern thought.

On Ms. Gripsholm the full time duty of three 2,500 hp. Diesels is to drive injection air compressors for the main engines. The total electrical output is therefore 990 kw. On the Asturias, where the main engines drive their own injection air compressors, the electrical output is 1,600 kw. This vessel is, of course, slightly larger. On the Augustus, however, the electrical output runs up to 3,200 kw. there being three 900 hp. Diesels supplying current to the turbo-scavenge blower motors and five 425 hp. Diesels for generating purposes. Note here that Augustus has double-acting 2-cycle Diesels and that 1,800 kw. alone of the auxiliary load is used for scavenging

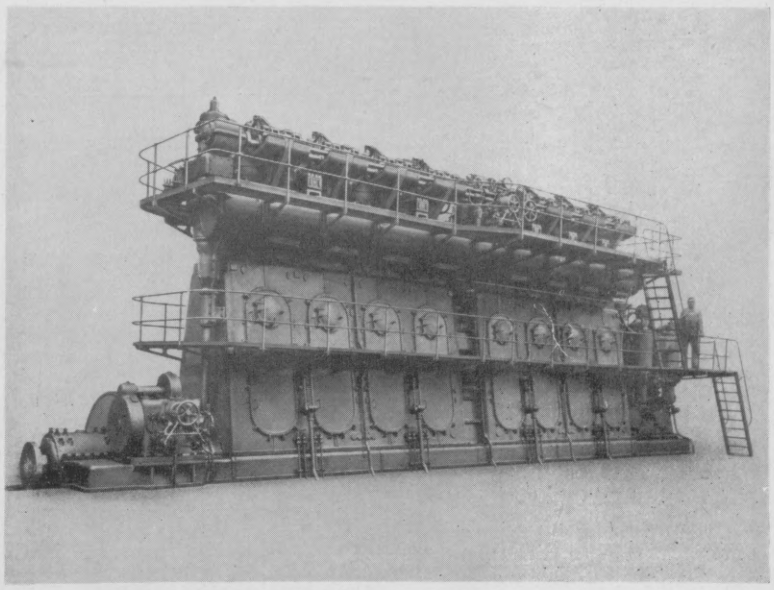
In discussing auxiliary powers it is a little surprising to find that hydraulic cargo cranes are used on the big Royal Mail Steam Packet Company's Asturias and Alcantara when the rest of the auxiliary machinery of the ship is electrically driven. The practice of the company is, of course, to handle freight by crane rather than by boom and winch, but even so, there are quite satisfactory electric cranes on the market. Hydraulic cranes provide an already well-stocked machinery space with an additional unit—the hydraulic engine. Electric cranes would take their driving power from the main generators. There are probably very definite reasons for doing this, but so little worth while information on these vessels has been released that it is difficult to express exact opinions on the matter.

Continuing this thought of high auxiliary powers, in fact, it is but natural to ask the question, if the auxiliary power increases so much with the increase of main propulsive power, why not combine the two and drive everything from generating sets—at least on a ship of above say, 30,000 hp. The Italian proposal and the German suggestion quoted above both show considerable advantages in layout over steamers, while they give clear deck spaces to an extent not realized in some motorships, because their engines are characteristically low in headroom. This the Diesel-electric layout does also. Furthermore, it gives extreme flexibility and economy for the following reasons:

There are wide limits to the number of Diesel generating sets to be employed. Disadvantages do arise, of course, from too many, but sixteen or even twenty small, high speed, trunk piston, airless injection engines, of stock size and therefore of reasonable price, do not seem to offer great difficulties, although at first such an arrangement seems very complicated. In fact, the greater the number of generating sets the greater the range of power, because units can be shut down exactly as necessary to take care of fluctuations of load. Say, for example, outward, refrigerating machinery will be in operation; homeward, this may not be required and generator sets



Sulzer 4-cylinder single-acting Diesel connected to generator



Sulzer 8-cylinder single-acting Diesel for motorliner P. C. Hooft

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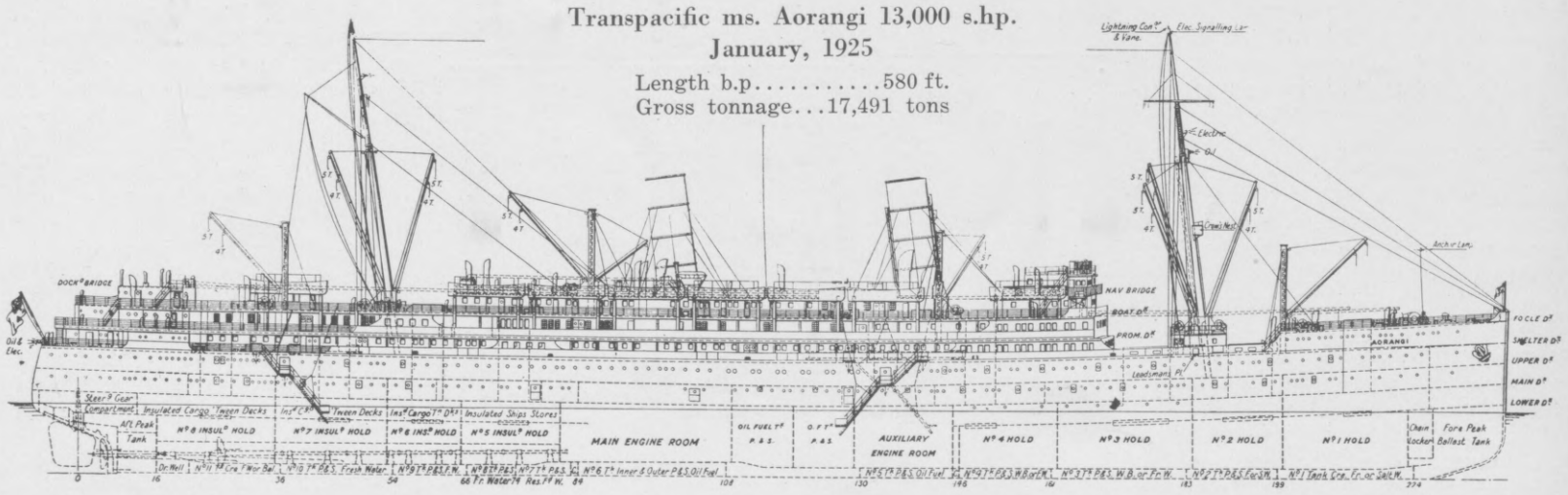
Typical Ocean-going Passenger Motorliners of the 1925-27 Era

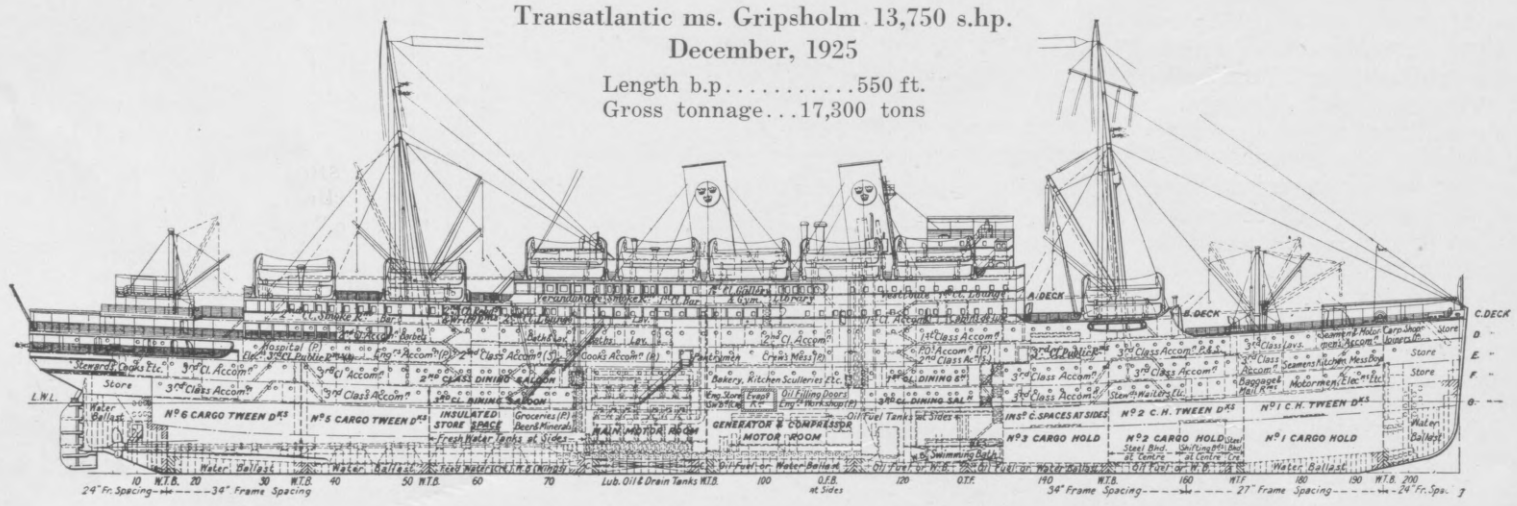
Transpacific ms. Aorangi 13,000 s.hp.
January, 1925

Length b.p.....580 ft.
Gross tonnage...17,491 tons



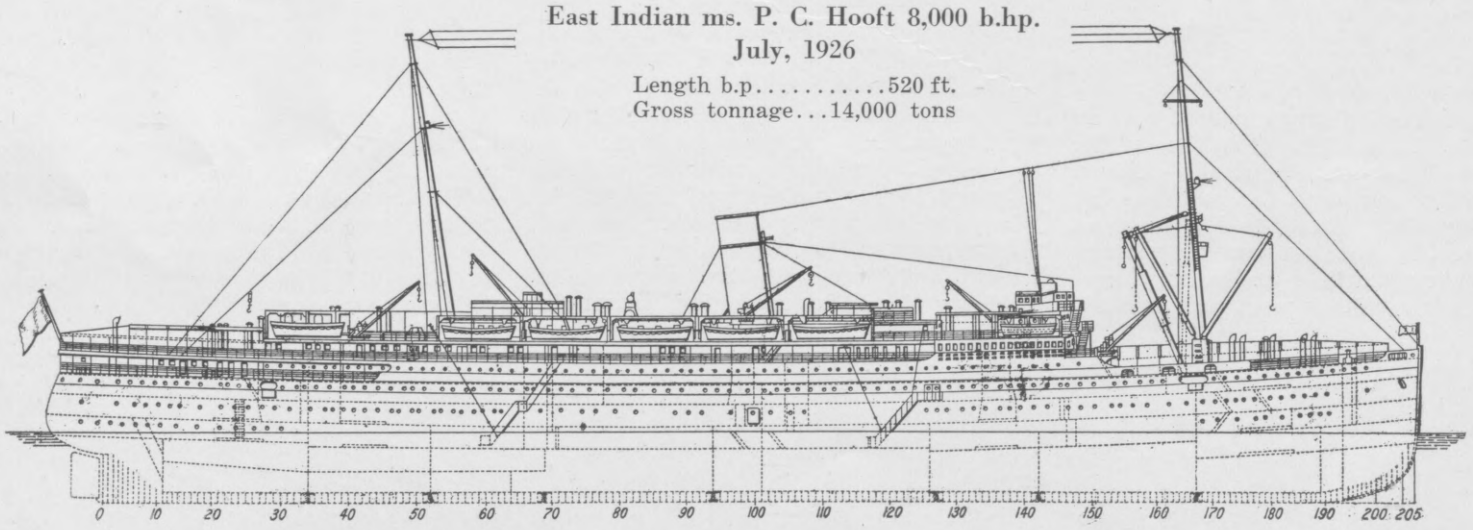
Transatlantic ms. Gripsholm 13,750 s.hp.
December, 1925

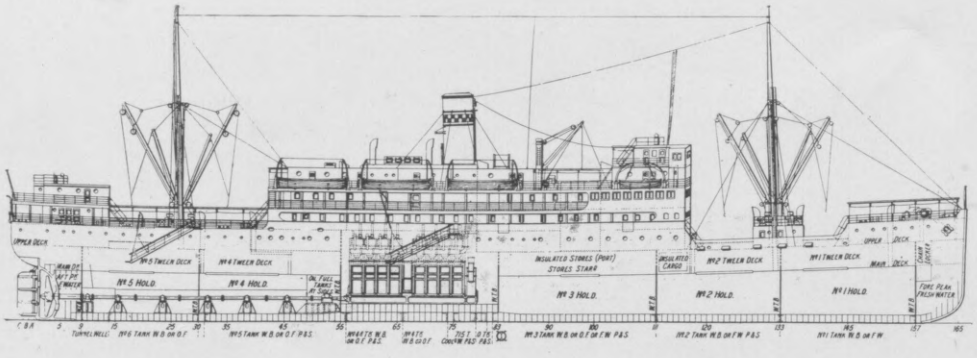
Length b.p.....550 ft.
Gross tonnage...17,300 tons



East Indian ms. P. C. Hooft 8,000 b.hp.
July, 1926

Length b.p.....520 ft.
Gross tonnage...14,000 tons





Australian ms. Malabar 2,700 s. hp.
December, 1925

Typical moderate size passenger cargo motorship operating between Australian ports and S. Sea Islands

Length b.p.....350 ft.
Gross tonnage.....4511 tons

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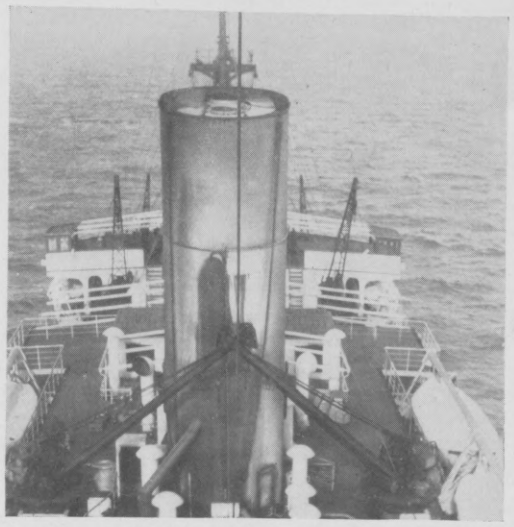
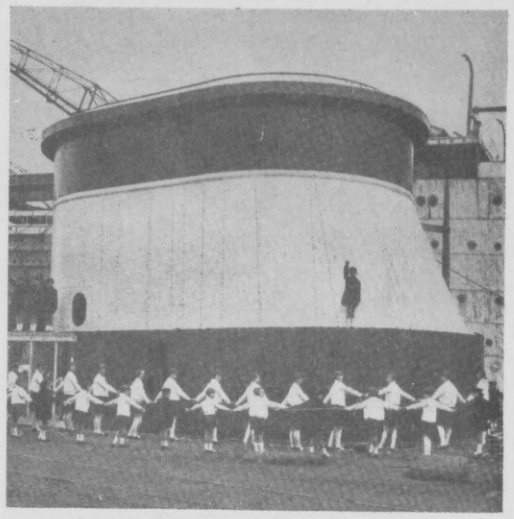
"Cruiser pattern" stacks on ms. Asturias



Conventional stack on ms. P. C. Hooft.



Elongated oval stack on ms. Saturnia

can be shut down accordingly. Then again in port the majority of the units can be shut down. In this respect alone, Diesel-electric drive is very definitely superior to turbo-electric drive. Also minimum time is spent in port overhauling because, in rotation engines can be laid off for this purpose at sea. We must also remember, in all fairness, that existing big double-acting sets seem to be functioning with the minimum of overhaul time.

In the electrically propelled liner the Diesel generators take care of the whole of the auxiliary load and no auxiliary generating sets—even of a standby nature—are required.

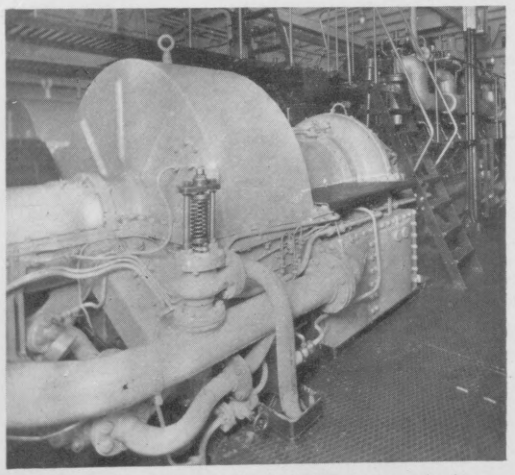
There is no special reason for confining all the Diesel generating sets to one deck, neither is there any reason for confining them to one engine room. Indeed flooding and emergency considerations would appear to dictate otherwise. Difficulties might be experienced in arranging generators on two decks because of vibrations, added weight to the hull structure under the topmost engine deck for stiffening and a net raising of the center of gravity with a corresponding "bite" taken out of the safe metacentric height.

But whether we arrange our generators on two decks or on one is a small import compared with the idea that the present system of trunked engine room entrances running up through five or six decks must sooner or later be superseded by decked-in engine rooms with trunkways for entrances and small fan trunks for ventilation. This is the trend of development for the large type passenger motorliner and with it will come pilot house control and other electro-navigational refinements. In the meanwhile there is an ever-increasing number of existing and proposed motor passenger liners of 15,000 to 30,000 hp. How has direct Diesel drive improved such ships?

The principal improvement shows itself in the point mentioned above, namely, clear passenger spaces with absence of hot boiler room uptakes. With this is linked also the clear public rooms. These advantages have not, however, been unaccompanied by complimentary problems. Clear public rooms, for example, with through beams extending from side to side of the ship require very careful watching to avoid vibration and should be suitably arranged for pillaring. There is one well-known passenger motor liner in which a certain amount of vibration is felt in the social hall when the auxiliary generating sets are running while this is entirely damped down when the main engines are in operation. This is a state of affairs always liable to happen when a number of comparatively high speed prime movers are running in a ship structure and, it must be confessed, that it is a condition particularly to be guarded against in the large Diesel-electric propositions outlined in the foregoing. It was experienced, at times with particular discomfort to passengers, in the steam reciprocating engined transatlantic flyers KAISER WILHELM II and KRONPRINCESSIN CECILE, and it is a condition which requires particular study and care.

Cleanliness is another point of great value from a passenger carrying viewpoint. There is a gratifying absence of smoke, dirt and heat in the motor driven vessel. The former inconvenience and dirt of coal bunkering are things unknown. All these are factors in favor of the motorliner apart from the generally accepted and understood economy of the motorship as an ocean carrier. The fact that the motor passenger liner is something distinctly novel, too, puts a big potential weapon into the hands of the passenger agent. Novelty always has a drag with the public although this is a point which is going to lose its edge as motorliners become more and more common.

As we have seen in the case of the motor freighter, the fact that the motor passenger liner was a separate entity was not at first realized and AORANGI, pioneer big passenger motorliner and one of the most graceful ships which ever left a builder's yard, followed very much steam practice. She had two oval stacks gracefully raked both of which were "live" stacks. The aft stack takes the mufflers, or silencers, from the main engines and the forward one the mufflers from the auxiliary engines in addition to the flue gases from the auxiliary boilers.



Vulcan Foettinger hydraulic transmission clutch and reduction gear

Much the same arrangement is employed on Ms. GRIPSHOLM, the second large passenger motorliner, and both stacks in this case are "live," the aft one taking the main engine mufflers horizontally under the base while the forward one carries, similarly, the auxiliary engine mufflers and the small heating boiler uptake. AORANGI'S mufflers are vertical below the stack and on each side of the aft stack is a scavenge air intake to the turbo-blowers for the single-acting 2-cycle main Diesels.

In Ms. ASTURIAS and the big "Kylsant" group of motorliners all the exhausts are combined in the aftmost of two very distinctive flat oval "cruiser pattern" stacks which lend to the ships a wonderful air of distinction. The forward stack is purely a dummy structure mounted, for appearance, on the topmost deck; it is used for the storage of deck gear and cargo clusters. Even more distinctive is the odd looking structure used on the Cosulich liners VULCANIA and SATURNIA, propelled by B. & W. double acting engines and coming within our arbitrary 15,000-30,000 hp. group.

On these vessels indeed we may notice a distinct attempt to evolve a definite motor passenger liner entity. The decks are stepped back and pyramid up to the stack which is about in the center of the ship. The idea of making the motorliner distinctive is a good one aesthetically as well as economically. It does not seem probable that the stack will ever entirely disappear, although its design will be modified. Mufflers from the engines must always be housed somewhere and some form of stack and a small uptake is the best way of doing this. A Diesel-electric vessel with large numbers of prime movers may possibly run into constructural complications on this score which would prove expensive.

It seems safe to predict that we shall gradually come around to wide, clear deck spaces and small machinery openings with perhaps side loading to handle spare parts. Then, if electric propulsion is used (here we refer to the very high powers) with main propulsion motors aft big ventilators will be needed for the motors. Perhaps these will be combined in a stack.

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Diesel-electrify the Mount Vernon

This Article Suggests to Diesel Engine Builders Some Possibilities of Fitting Diesel-electric Drive for About 30,000 Hp.

AT the time of going to press no definite action has been taken by the Shipping Board as to the reconditioning of the big passenger liners MT. VERNON and AGAMEMNON. Unquestionably their presence in transatlantic passenger trade would go a long way to balance the existing one-sided service. Various reports have been current as to the probable fate of these two vessels and we understand that several plans have been prepared for their reconditioning. One report which came to our notice, was published in the *United States Daily*, Washington on April 9 and read as follows:

"Plans for the conversion of the passenger steamship MOUNT VERNON to Diesel electric propulsion, have been submitted to the Merchant Fleet Corporation by the Newport News Shipbuilding and Dry Dock Company, of Newport News, Va., A. C. Dalton, President of the corporation, announced on April 8.

"Mr. Dalton said that the advisability of putting the vessel, now laid up, back into service as a naval auxiliary would also be given serious consideration. Conversion of the vessel to Diesel drive, he explained, would enhance its value as a factor in the Shipping Board fleet.

"The proposal to convert the MOUNT VERNON to a motorship, Mr. Dalton added, was in line with the general program of the Shipping Board to install internal combustion propulsion wherever practical."

This report was later denied to us officially by the shipyard in question.

While the Shipping Board can use its current funds for proper maintenance (including reconditioning) of its ships it has not sufficient money on hand to carry out the above work directly. Consequently, the Board may have to wait for Congress to authorize transference of a further sum of money from the Construction Loan Fund before carrying out any reconditioning work on these liners.

It may be recalled that in 1924 Congress amended Sections 11 and 12 of the Merchant Marine Act of 1920, and that the amended Section 12 authorized the reconditioning of ships to include the substitution of the most modern, the most efficient and the most economical types of internal combustion engines as the main propulsive power of the vessels. Part of this fund is being expended in the conversion of 12 freighters to Diesel power and the Board proposes to use the balance of the funds for work on a further batch of ships. Under the law the Board could use the balance of this fund to instal direct Diesel or Diesel-electric drive in the AGAMEMNON and MOUNT VERNON but in so doing it would reduce the money available for converting additional freighters. It seems obvious under the law that if Congress uses any of the $25,000,000 for converting the AGAMEMNON and MOUNT VERNON, internal-combustion engines must be used.

The situation surrounding these two ships is a curious one and it is rendered all the more curious by the age of the vessels. Built in 1902 and 1907 respectively, the steamers KAISER WILHELM II and KRONPRINCESSEN CECILE now AGAMEMNON and MOUNT VERNON were designed primarily to capture the Blue Ribband of the Atlantic from British Cunard "flyers," then in commission.

Secondarily, they were intended for auxiliary cruiser work and an examination of their design proves how very effectively this was done. They were propelled by four sets of quadruple expansion steam reciprocating engines, which on two shafts were capable of developing a total power of about 45,000 i. hp. As the machinery arangement, which we reproduce opposite, well shows, these powerful steam units were arranged in four distinct watertight compartments, two engines being coupled to each propeller shaft and each engine of a pair being arranged so that it could be disconnected from its neighbor, thus the ship could steam at full speed on four units or cruise on two units. Furthermore, no frictional losses were experienced in the two foremost units while cruising, because these were disconnected from the aft units.

The engines themselves were built just before the turbine made its appearance in fast transatlantic ships. They represented the zenith of steam reciprocating engine construction and when we read today reports that the machinery is virtually as good as it was when the ships were new, we feel that such a report is no exaggeration. The workmanship put into these engines was of a type which is seldom found nowadays. Indeed, progress at the present time is so rapid that it is questionable whether such excellent workmanship would be advisable even if it were obtainable.

Classics of naval architectural art though they were, these two ships were not without their troubles. As every man who has had anything to do with motorships readily appreciates, a vessel with four high-speed reciprocating units arranged in a hull, where lightness of structure is paramount and weight-cutting a "sine qua non," is liable to run into serious trouble with vibrations. This actually happened on both these ship and, incidentally, should serve as a reminder to critics of the motorship that troubles we are now fighting are no new troubles but rather the old wolf in possibly a revamped sheep's skin. Then again, like many ships designed in German shipyards, the vessels were not blessed with an abundance of stability. Small metacentric height may be in certain circumstances a blessing, particularly in passenger vessels but there are points below which it is not advisable to go.

At the time of their construction, these two ships were probably the most beautifully fitted out ships of any on the Atlantic. Famous architects, designers, and painters from all over Europe were called in to make the vessels as aesthetically perfect as possible. But passenger accommodations of 1907 and of 1927 are vastly different, and in particular the modern American traveler, who is perhaps the connoisseur of travelers, demands a different type of luxury. The LEVIATHAN is one of the outstanding examples of hotel practice taken afloat, and if these two ex-German vessels are to be brought up-to-date, considerable interior structural alterations will need to be carried out. Of course, actually it seems a strange thing that the Shipping Board should be compelled to revamp such old tonnage. New Diesel driven ships could be constructed for very little greater cost than the conversion of these two vessels as they stand, and the price of the old vessels for scrap could easily be offset against the cost of new vessels. Since, however, new construction does not seem possible it is interesting for domestic Diesel engine builders to take a look at the question as it stands.

We have already pointed out in a previous issue that it is worth considering what can be done in this direction by Diesel engine builders. At the same time we do not definitely state that the problem is one which can be tackled easily. Various proposals have been made with regard to powering the vessels. One proposal, which seems to have much to recommend it, says that the original machinery should be left in the vessel. This, of course, means the minimum of cost but it would certainly require for economical operation that the existing boilers would have to be made oil fired. Then again these boilers are old and it might be found that they would have to be entirely removed. Apart from this there is the question of the old vibration trouble in addition to the trouble of stability so that this plan, which would on the surface appear a good one, might lead into all sorts of trouble later.

Assuming, therefore, that the ships must be gutted, what possibilities are then before us? The use of steam naturally suggests high pressure steam turbines and watertube boilers. In all fairness it must be admitted that there are two advantages in the way of this. The first is that the heavy turbine would result in a net lowering of the center of gravity of the ship with an improvement in stability. In the second place we understand that a duplicate set of the MALOLO turbines could be rapidly constructed and would, with very slight modification, be applicable to the new ships.

The third suggestion, and this of course, is the one in which we are especially interested, is that the ships should be Dieselized. The present indicated horsepower we have shown is 45,000, which gives the ships a speed of about 23 knots. It is conceivable that a smaller power than this might be adopted if the ships were reconditioned. Indeed, we seem to remember having definitely heard this fact stated. Let us say,

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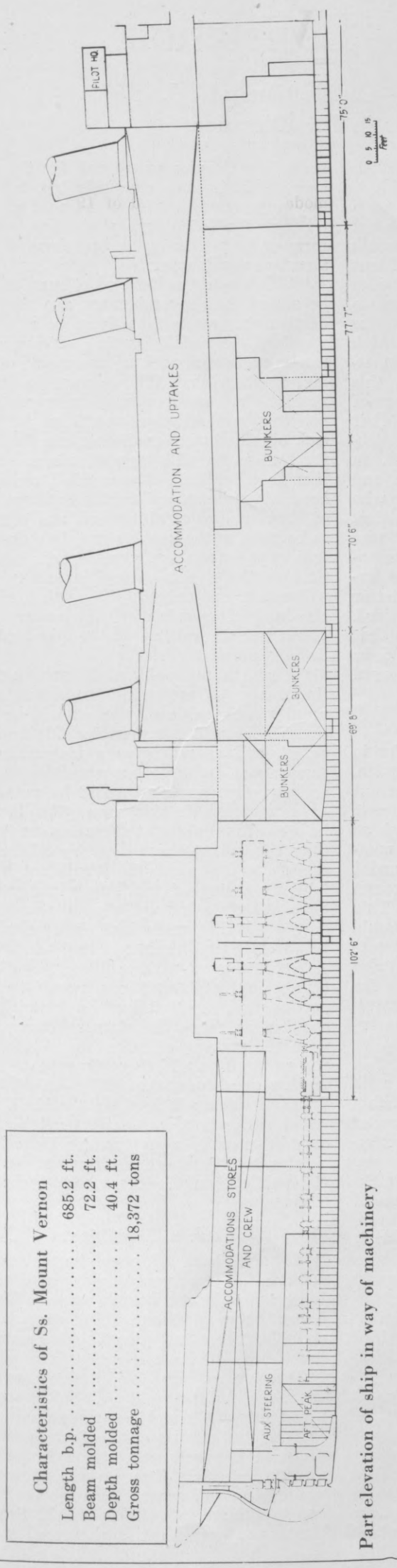
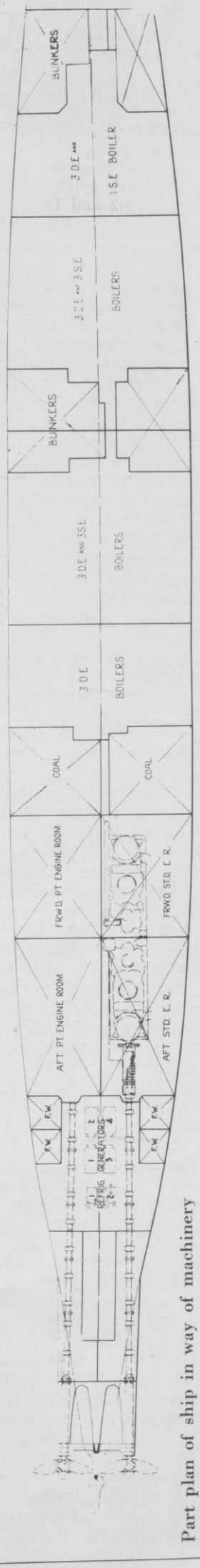


Characteristics of Ss. Mount Vernon

Length b.p.	685.2 ft.
Beam molded	72.2 ft.
Depth molded	40.4 ft.
Gross tonnage	18,372 tons

Part elevation of ship in way of machinery



Part plan of ship in way of machinery

Sketch of machinery arrangement of the passenger liners Aga memnon and Mount Vernon gives Diesel builders a good idea of their problems in the Diesel-electrification of the ships. The big boiler rooms would appear a good place to house generator sets, while the main propulsive motors could be arranged in the existing engine rooms

for the sake of argument, that 35,000 or 40,000 hp. would be needed. We believe that there are existing today Diesel engine builders in this country who would be capable of constructing a Diesel-electric plant to give this power. It is for this reason that we reproduce the engine plans of the two vessels opposite. We make no definite suggestions as to how such plants should be laid out. We merely publish the plans and the article in order to stimulate interest in the matter because we feel that the fact that these two vessels are hovering between steam turbines and remaining as they are is a direct challenge to Diesel engine builders in this country and an indirect challenge to Diesel engine builders throughout the world.

A large British company trading in the Far East has recently placed an order for an electrically propelled ship in which the prime motive power is supplied by high pressure turbines. While we naturally deplore the fact that turbines should be used for this purpose we feel glad that such an order should have been placed because it shows definitely that shipowners are taking interest in the matter and it is up to the Diesel engine builders to take up the challenge.

We have suggested Diesel-electric drive for the MOUNT VERNON and AGAMEMNON because at the present time it seems a logical method of solving the powering problem, but it may be that we are wrong in this assumption. The double-acting engine or a combination of single-acting Diesel engines may prove to be a solution. These two ships have, however, a large number of boiler rooms and these, when gutted, would appear to be a very good place for the location of a number of moderate sized generators. Exactly what there is to a layout of this type we have briefly touched on in the first article of this issue. The remarks in this article are intended to stimulate interest and are intended possibly to open up a new field for any builder of engines whose product will develop around about 1000 hp. and over.

We shall be more than pleased to receive our readers' opinions on the sentiments we have herein expressed and it would certainly be of great value to the industry as a whole if some suggested layouts were sent in to us for publication.

The Furness-Bermuda Motorliner

Apropos of the new Furness-Bermuda motorliner which is to revolutionize travel between New York and the island the following quotation from a current Furness-Withy pamphlet is interesting. It says:—"The demand for superior accommodations in the New York-Bermuda Service has been so great that the Furness-Bermuda Line decided to build at once one of the largest quadruple screw, motor-driven vessels in the world, to accommodate 600 first-class passengers, which will embody every known element of comfort and safety devices.

"The state and public rooms will be not only very large, but are specially designed.

"This motor-driven vessel will be of approximately 20,000 tons register, 550 ft. long by 74 ft. beam, with a hull especially designed to produce great steadiness, and will be ready for the winter season of 1927."

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Motorshipping Needs New Legislation

Existing "Steamboat" Laws Require Revision—Codification of U. S. Navigation Laws Is Seen as a Preliminary Step in This Direction

WITH the gradual recognition of the Diesel ship as a separate entity, as different from a steamer as the steamer in her turn was from the sailing ship, people are beginning to ask whether new legislation will not shortly require to be brought into being especially to take care of the varied problems which motorshipping is bringing in its wake. It must be distinctly remembered however, that legislation on this subject will have to be a very gradual and carefully thought out nature. The change from steam to Diesel is very naturally gradual, and change in legislation will have to be similarly gradual. There are so many different factors at stake. Then again legislation, which may on the surface appear perfectly right and fair at the time, and which may help out one class of individuals in the motorshipping business may be entirely derogatory to the wishes and problems of another set of individuals. Particularly is this so in this country when matters effecting very small motor and gasoline driven craft are touched upon.

Tonnage Anomalies

One of the most outstanding irregularities in law at the present time effecting the motorship in an unfavorable light is, of course, tonnage measurement. The existing system gives builders no incentive to make their engine rooms as small as possible. In fact, in many cases the law penalizes them for so doing. In a few other cases, of course, as the steam enthusiasts will be only too ready to tell us, it is not possible to get a Diesel engine installation in a smaller space than a steam installation. This only applies to a small and decreasing number of cases.

Then there is a question of Steamboat Inspection Service rules. The very term "steamboat" indicates the fact that revision will soon be necessary. Some time ago MOTORSHIP approached Mr. Hoover, the Supervising Inspector General of the Steamboat Inspection Service, Washington, regarding the inspection of motorvessels. The observations of this gentleman on the matter are of no small interest. Mr. Hoover says:—

"An examination of the laws governing the Steamboat Inspection Service will show that the law makers had in mind steamers in particular, and the statutes go into considerable detail with regard to that type of vessel. Later on, under Section 4426, of the Revised Statutes, certain authority was given to the local inspectors of this Service to inspect what were properly referred to then as motor *boats*, and it is probable that when that law was written it was never contemplated that there would be such a development of the internal combustion engine as would result in its use in other than small craft. But times have changed, and, increasingly, we see this type of engine coming into use for both passenger and freight *ships*.

"Later on, we have the law of 1910, known as the so-called Motor Boat Act, which, while it may be considered as a step forward to a certain extent, does not really cover the situation that confronts us today, and that law is not consistent from the standpoint of safety for it does not insist upon certain safe conditions to the extent that it should on certain classes of vessels. For example, today, and I think properly so, every towing steamer, no matter how small, must be inspected by this Service and must carry licensed officers of this Service, but, under the law today, it is also permitted that a vessel may be propelled by steam power under 65 ft. in length, carrying passengers for hire and yet be in charge of a licensed operator who need not be a citizen of the United States, who need not be 21 years of age, and who obtains his license without any examination whatever, and this boat is not inspected annually. It carries only a letter of approval of her machinery. In a word, in that case, less protection is given that craft carrying passengers than would be given that same craft if she was engaged in towing.

How to Make Changes

I might go through the law and refer to other things that should receive attention, but it seems to me that the most important thing is not to convince thinking people that there should be a change so much as to inspire faith in them as to the best manner in which to obtain this change, and I believe that the best way to do it is through the Board of Supervising Inspectors. This could be done by a brief bill that would give to the Board of Supervising Inspectors the authority to formulate such rules and regulations as may be necessary for the inspection of motorboats and motorships. It might be well in that bill to lay down what classes of vessels should be inspected, but even there again the Board of Supervising Inspectors might be left with discretion. It will be found, however, that there would be many who would dislike, or not agree at all, to this proposition, believing that the Board of Supervising Inspectors would go to extremes and would make it as difficult as possible to operate a motor boat or a motorship that was subject to inspection. This fear, however, is entirely unjustified, as will be witnessed by the action of the Board of Supervising Inspectors with reference to fire control on steamers. You will recall that we have had certain bad fires on coastwise ships. In those cases we have not proceeded to legislate blindly, without any investigation whatever. In fact, we have not legislated at all, but we have sought and we have obtained advice of the most expert kind from people who are vitally interested, and when we shall have considered all of this excellent material, we will then be in a position to proceed intelligently and constructively, for it is to be borne in mind that the Steamboat Inspection Service exists not for the purpose of destroying any industry, but for the purpose of developing as well as protecting, for intelligent protection in the form of inspection is the best form of constructive development.

"With regard to licensed officers, it may be stated that several years ago the suggestion was made that there be a higher standard, especially with reference to motor engineers, and, as the result of the investigation that this Service conducted at that time, we have made very material progress in that respect until we have, at last, obtained very creditable examinations for license for this type of officer. More than that, for the last year this Bureau has been actively engaged looking to the raising of the standard of all officers, and it hopes to be able, in the near future, to make certain suggestions and give certain instructions to the Board of local inspectors that will result not only in the raising of the standard of examination for motor engineers, but the raising of the standard for licenses of all kinds.

"What, in my opinion, is necessary in the matter of motorship inspection is to require such an inspection as will be reasonable, as will not penalize this type of vessel, and as will give a motorship the same equal and fair opportunities, so far as inspection goes, as would be possessed by a steamer. In this connection, it is to be borne in mind that there are some things that the statutes are very specific about concerning steamers, that could not be intelligently applied on board motorships, and, therefore, if we should proceed to simply say that motorships shall be subject to all of the requirements that are applicable to steamers, we would very soon be in a most confused condition; hence, the suggestion that the Board of Supervising Inspectors be, under the statutes, empowered with the making of rules and regulations for motorships. If there is any objection to this procedure, that objection is based primarily upon a lack of faith in the Board, and I sincerely trust that if that be so it may be speedily overcome, for there is no service that is more desirous of serving the public than the Steamboat Inspection Service."

Work of Law Bureau

It is also here of some importance to mention the work now being carried out in Washington by the Bureau of Law, United States Shipping Board. This Bureau has recently successfully completed a complete codification of the navigation laws of the United States. This codification contains all of the statutes of the United States, of a general public and permanent nature in force at the closing of the first session of the 69th Congress relating exclusively or directly to vessels, their owners, their masters, officers and crews. This proposed code was introduced into the Senate by Senator Wesley L. Jones, of Washington, at the

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last session of Congress, and was referred to the Committee on Commerce by which it was reported out with the unanimous recommendation that it be passed, but owing to the press of legislation, no action was taken. It will, however, be reintroduced at the coming session of Congress in December.

The codification appears in a large volume and is arranged in two parallel columns, the first of which contains the language of the statutes themselves, accompanied frequently by notes referring to related statutes which are not, however, so close related with the subject matter above mentioned as to be included in the codification. The second parallel column contains a restatement of the statutes set out in the corresponding section in column one, in code form, but in each case the language used in the code, column 2, is believed to be accurate, exact and a complete statement of the contents on the statutes contained in column one, from which they were drawn section by section. Opposite is a table giving the chapters of the codification with contents.

It will be seen that under these chapter headings are many laws concerning motorshipping capable of revision. Before any action can be taken in the matter, however, Congress must pass on the codification, and after this, work can with advantage be commenced to revise some of the laws to make them suitable for modern motorshipping application.

This represents but a commencement and the introduction of a thought, but we feel that it shows people's minds are turning

Merchant Shipping Acts

Chapter 1.—Documented and Recorded Vessels.
Chapter 2.—Measurement of Vessels.
Chapter 3.—Marine Inspection Service.
Chapter 4.—Officers and Pilots of Merchant Vessels.
Chapter 5.—Shipping, Rating, Wages and Discharge of Seamen.
Chapter 6.—Protection and Relief of Seamen and Effects of Deceased Seamen.
Chapter 7.—Offenses by and Against Seamen.
Chapter 8.—Entry and Unloading of Vessels and Landing of Merchandise.
Chapter 9.—Clearance of Vessels.
Chapter 10.—Customs Officers.
Chapter 11.—Coastwise Trade.
Chapter 12.—Fish and Fisheries.
Chapter 13.—Aids and Obstructions to Navigation.
Chapter 14.—Passengers and Immigration.
Chapter 15.—Classes of Cargo.
Chapter 16.—Consular Service.
Chapter 17.—Public Health and Quarantine.
Chapter 18.—Tonnage Dues & Taxes Discriminatory, Provisions & Special Taxes.
Chapter 19.—Marine Postal Service.
Chapter 20.—Collisions.
Chapter 21.—Rights, Immunities, and Liabilities of Shipowners and Carriers, and Enforcement.
Chapter 22.—Sales, Charters, and Mortgages of Vessels.
Chapter 23.—United States Shipping Board.

in the right direction. MOTORSHIP would be the last to suggest a wholesale turning up-side-down of present legislation. The question of licenses for engineers on some vessels, for example, might be perfectly good on the Atlantic Coast but impracticable on the Pacific Coast. We can, therefore, here merely hope that our article will serve to draw people's attention primarily to the fact that revision of legislation will soon be necessary, and then to the fact that some preliminary efforts are already being made in this direction.

Cargoes moved through American ports during 1926 were 20 per cent greater than those of the preceding year when the previous high record was reached, according to a special report just completed by the United States Shipping Board Bureau of Research. The total volume of water-borne foreign commerce through U. S. ports last year exceeded 112,900,000 cargo tons.

The 1926 export total was 68,100,000 tons, or 34.7 per cent greater than the export total of 1925. Most of this increase consisted of coal shipments to meet demands caused by the strike in British coal mines. The coal exports of 1926 were 15,615,000 tons, 171.7 per cent above those of the previous year and reached a total of 24,700,000 tons; the greatest water borne movement of a single commodity ever recorded. Exports of commodities other than coal show an increase of 1,900,000 tons, 4.67 per cent over similar exports in 1925. The import movement in 1926 was approximately 44,800,000 tons, an increase of 876,000 tons, 2 per cent over the 1925 import total.

Five Canadian Motorliners

THE Canadian Government has had under consideration for just over a year plans for the construction of a fleet of modern up to date passenger-cargo ships with refrigerated holds to take care of the requirements of service between the Dominion and the West Indies. It is now announced that the Canadian Government Merchant Marine officials will build five ships to meet the requirements provided for in the trade treaty entered into some time ago. The Canadian government awarded the contract to the C. G. M. M. only after it was found impossible to accept the proposals submitted by private interests on two different occasions. Plans for the new ships are now being completed and tenders will be called immediately. These vessels will not be ready for service until some time next year.

In the original announcement of the program, motorships were suggested as being very suitable for this purpose and tenders were to be called for on this basis. It would seem that for ships of this type, i.e. with refrigerated holds, the merits of the Diesel-electric drive are well worthy of consideration. United Fruit Company, we understand has every reason to be satisfied with this choice in two of its ships.

The vessels engaged in the service will be of about 8000 gross tons each and are to be specially designed for the West Indies service. They will be equipped with modern refrigerator plants for the requirements of the fruit trade, and will have a speed of about 14 knots.

The trade treaty agreement calls for a fortnightly passenger and freight service throughout the year from Canadian ports to ports in the eastern group of islands making up the West Indies, and an adequate service to the islands in the western group.

East Asiatic Co.'s New Motorship

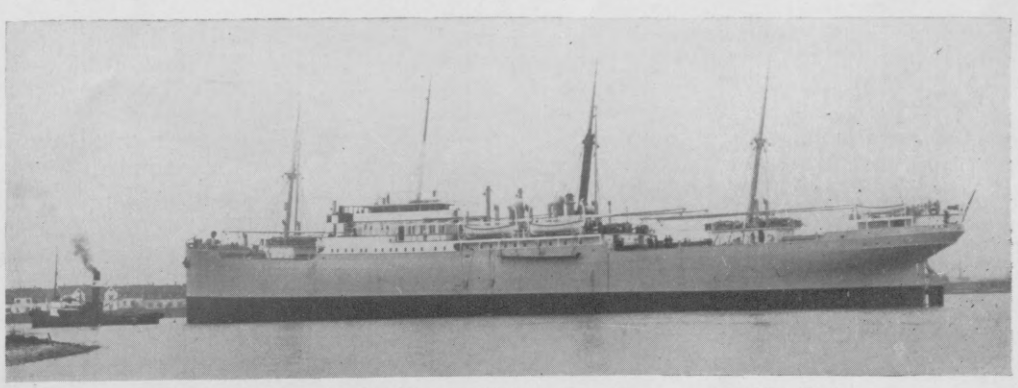
Ms. LALANDIA latest motorship of the East Asiatic Co., Copenhagen is now completing her maiden voyage. The new ship has a length b.p. of 390 ft., a beam molded of 53 ft. 3 in., a depth molded to shelter deck of 36 ft. 0 in. and a deadweight capacity of about 7,500 tons.

She is a shelter deck ship with a top gallant forecastle, bridge house and houses amidships and aft. There are five hatches, four masts and four samson posts, with a total of sixteen derricks.

The ship is destined for the E. A. C.s Bangkok route, and is beautifully furnished, with accommodation for 34 passengers in large cabins. The ship has a dining-hall, music-room and smoking-room, all situated in the bridge-house and in a deck-house on the top of the bridge-house.

The propelling machinery consists of 2 B. and W. Diesels of 5,000 i.hp. total, giving the ship a speed of 14 knots.

After completing a cruise of 33,000 nautical miles round Africa the Royal Mail motorliner ASTURIAS docked at Southampton at 3 p. m. on one day and left again at noon three days later. She arrived in New York and docked at 9 a. m. on one day and sailed the following day at exactly 2 p. m.



Ms. Lalandia is the latest addition to a large motorship fleet

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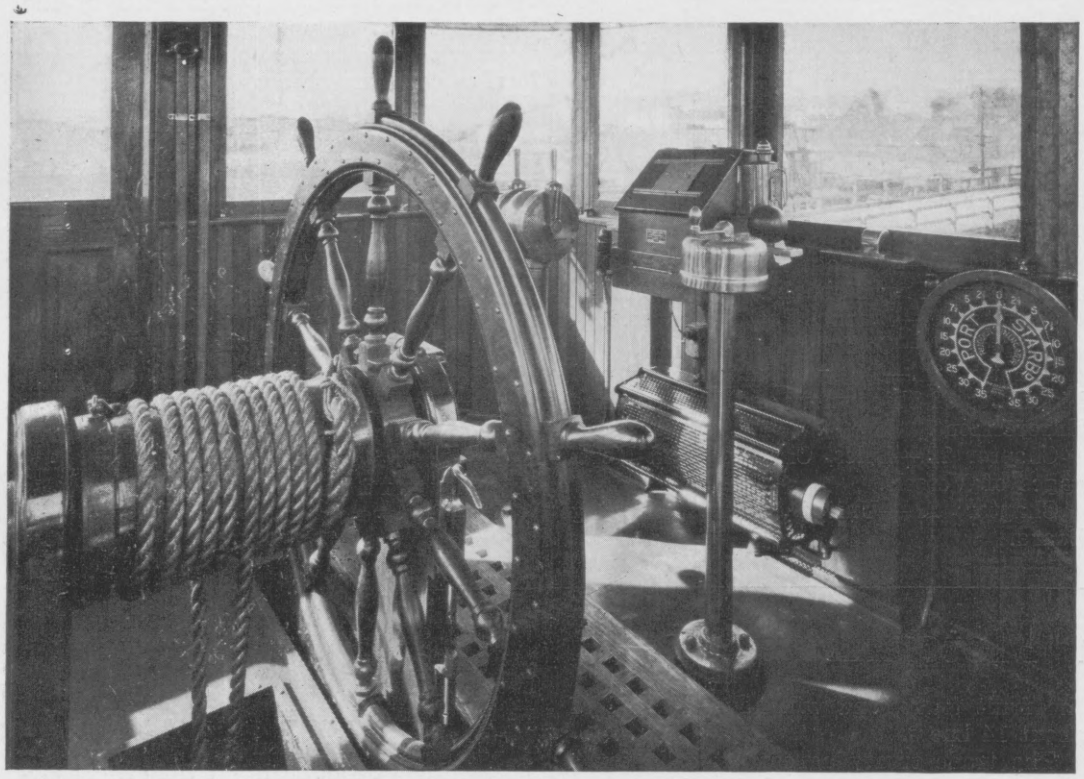
Pilot House Control Controversy

Steamboat Inspection Condemns Use on San Francisco Bay Ferries, but Inspector General "Agrees in Principle"

MODERN electrically propelled ferryboats operating on San Francisco Bay routes are faced with a curious situation. Local steamboat inspectors, it appears, are barring the use of pilot house control and an order has been sent to all local inspectors of hulls and boilers, which reads to the effect that on ferryboats whose engines are operated from the pilot house and are under pilot house control, the practice must cease immediately. Furthermore, it is stated, the engines must be handled by the licensed engineer stationed in the engine room for that purpose and the usual signals of transmission from pilot house to engine room used.



The simplicity of pilot house control is here contrasted with the old clumsy manual methods

The order, authority for which came from J. K. Bulger, supervising inspector of the Steamboat Inspection Service at San Francisco, is not worded in such a way as to be clear. Does the term "engine" refer to the main Diesel or to the propelling motor? There is always a licensed engineer in the engine room. In the case of the Diesel-electric ship if he is to control the "motor" direct he will have to be at the switchboard. Anyone with the most elementary knowledge of electricity knows that it is just as easy to place these controls in a telegraph stand in the pilot house as in the switchboard itself. Mr. Bulger says that the pilot has all he can do to steer the ship and sound his whistle. Has he considered that it is just as easy to move the control handle of a telegraph regulating power to the motor as it is to pull the handle of a jingle bell?

Has he considered that New York has had Diesel-electric towboats with pilot house control in operation in its crowded waterways for nearly 3 years?

Has he remembered that the pilot house controlled ferryboat POUGHKEEPSIE has been in service in the Hudson for 5 years?

Has he remembered that New York's pilot house controlled ferries are operating day after day in most congested slips?

Frankly this order is one which it is a little difficult to understand, and it has resulted in a state of affairs which cannot be passed up without comment. In commenting on the situation Mr. Bulger has made the following sweeping statement:

"For the protection of the traveling public, I do not believe that the engines of any ferryboat should be operated from the pilot house. The captain has all he efficiently can do to steer his vessel, sound his whistles and carry out the other duties of navigation without attempting to control the engines from the pilot house. He should transmit his signals to the engine in the regular way and allow them to be carried out by the licensed engineer there for that purpose. I am absolutely firm in this belief."

Westinghouse Electric's marine representative has equipped a number of San Francisco Bay ferries and has in reply made the following statement:

"Pilot house control of the motor driving the propeller on these ferryboats is better, safer for the traveling public and will be demanded when its merits are thoroughly understood.

"The control lever for operating the propelling motor at any desired speed ahead or astern is built similar to the ordinary engine room telegraph, and the pilot operates exactly as he does with the engine-room controlled vessel, but in this case, all possibility of misunderstanding between pilot and engineer is eliminated and the propeller revolutions are obtained instantly, instead of with the time lag involved when the pilot relays his order through a telegraph to the engineer."

Feeling that the situation was one affecting motorship progress as a whole, we have been in touch with Mr. Hoover, the Supervising Inspector General of the Steamboat Inspection Service, Washington, D. C. He says:

"Regarding the pilot house control situation on San Francisco ferries, you are informed that there has been correspondence in regard to this matter between the Supervising Inspector of the First District and this office, and on the 3rd instant I addressed a letter to the Supervising Inspector of the First District, stating that as there was no formal appeal before me, there was nothing in the nature of an appeal for me to decide, but if there were a formal appeal, I would say that I agree in principle with pilot house control on vessels of this type, provided that the machinery is so installed as not to destroy the efficiency of the engines, and provided further that additional means are furnished in the engine room for engine room control, in the event of failure of the pilot house control."

Pilot house control has so many advantageous features and they are so universally appreciated that Mr. Bulger's remarks are all the more surprising. On the score of passenger safety alone it is only necessary to state that pilot house control gives accurate landings with no loss of time. It also makes certain:

Avoidance of collisions.

Impossibility of mistaken signals.

Immediate response to the pilot's wish, thus greatly enhancing the safety of the ship.

Large number of small increments of speed change.

Centralization of responsibility in one man, the pilot, who is in a position to handle the vessel as one does an automobile.

Seattle's industrial waterfront has received another large contract, as the Standard Oil Company of California arranged to obtain from the Allan Cunningham plant all the electric deck machinery for its new tanker DISTRICT OF COLUMBIA. The vessel is in San Francisco, being converted to a Diesel-electric power tanker, the largest motor tanker in the company's fleet.

On March 1, 1927, American shipyards were building or under contract to build for private shipowners 278 steel vessels of 285,926 gross tons.

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New Diesel-Electric Coast Guard Cutter

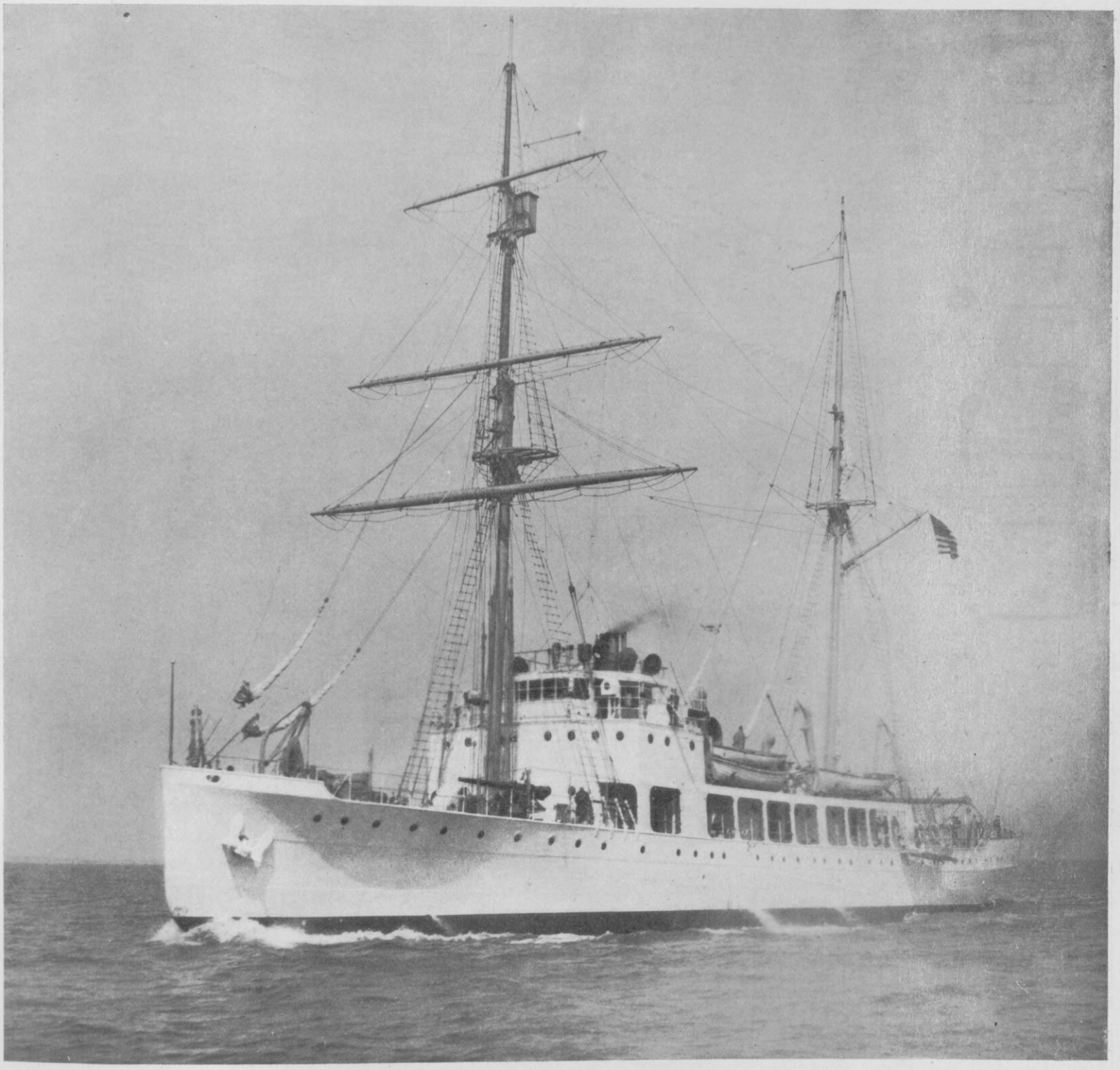
Northland Is Name of New Ship with 1000 Hp. Electric Motor Built to Operate in Arctic Icefields

DIESEL-ELECTRIC propulsion could receive no finer testimony than the fact that it was deliberately selected by the United States Coast Guard for propulsion of their new cutter NORTHLAND, which is shortly to relieve the famous old BEAR in the Arctic. The duties the BEAR had to perform were arduous and exacting. They were carried out in all weathers and demanded a hull of great strength and ice resisting qualities. Captain Newman, Engineer-in-Chief of the Coast Guard discussed both the old BEAR and the new BEAR at some length in our March, 1926, issue.

Characteristics of Ms. Northland

Length between perpendiculars	200 ft. 0 in.
Length, overall	216 ft. 6 in.
Breadth, molded	39 ft. 0 in.
Depth, molded	24 ft. 9 in.
Draft	15 ft. 0 in.
Frames spaced	2 ft. 0 in.
Displacement at 15 ft. draft	2050 tons
Shaft horsepower	1000 hp.
Speed (service)	11 kts.

The cutter NORTHLAND has been built by the Newport News S. B. & D. D. Company and she ran her sea trials towards the end of last month. After making a short visit to Washington she is expected to leave for the Arctic via the Panama Canal, when she will take up her new duties. NORTHLAND is designed for a speed of about 11 knots and is driven by a single propeller running at 120 r.p.m., the total s.hp. of the propulsion equipment being 1000. The power plant is extensive, consisting of two main generators and two auxiliary genera-



Diesel-electric propulsion was specially selected for propulsion for the Coast Guard Cutter Northland designed for heavy duty in the Arctic

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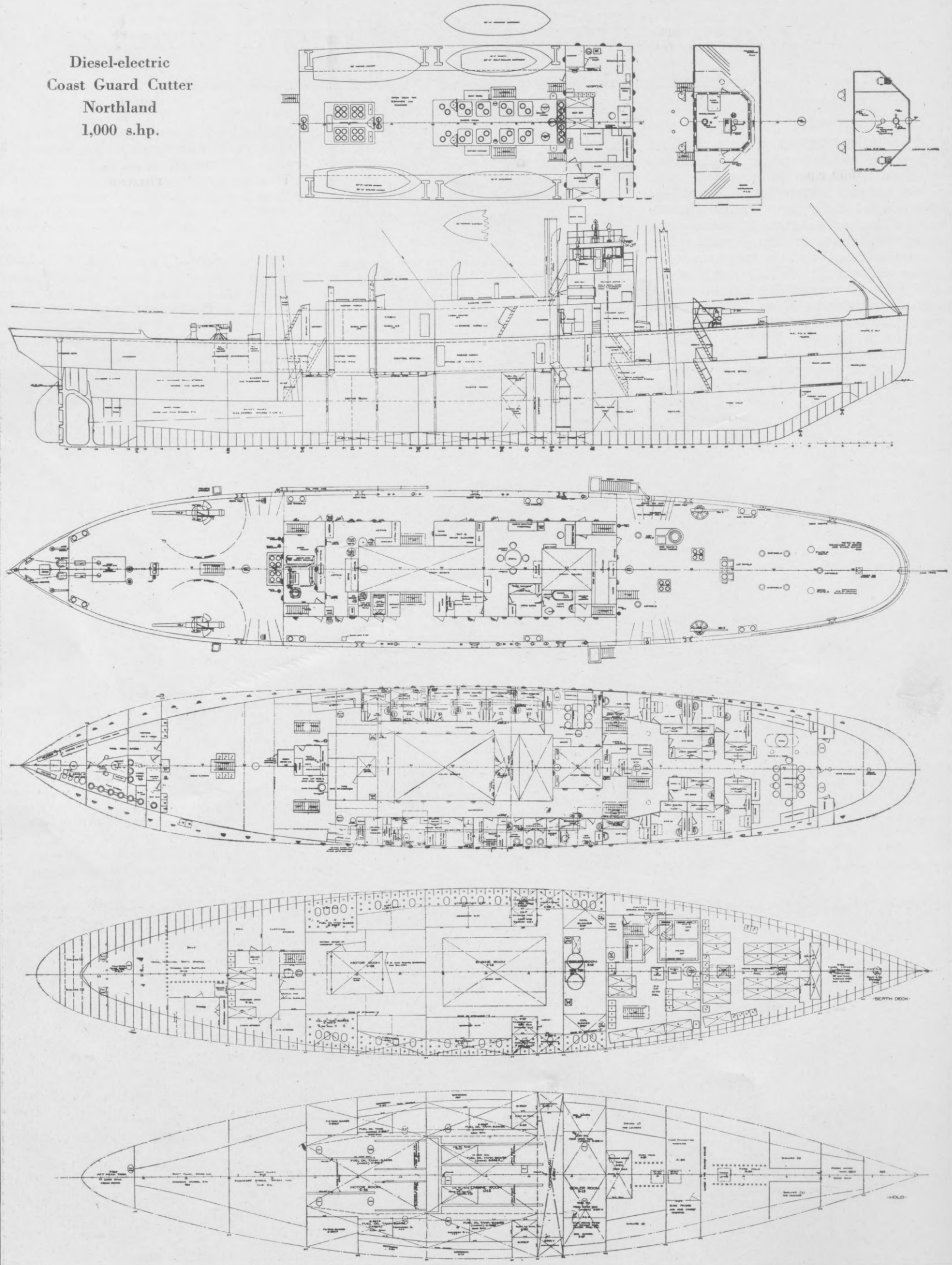
Diesel-electric
Coast Guard Cutter
Northland
1,000 s.hp.



Inboard profile and deck plans of the new Coast Guard Cutter Northland fitted with Diesel-electric propulsion

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tors mounted on shaft extensions of the main generators, and three independently driven auxiliary generators. All generators are driven by Diesel engines, those for the main units and exciters being 6-cylinder McIntosh & Seymour Diesels developing 600 hp. each at 200 r.p.m. Two of the independent generating sets are driven by 6-cylinder 90 hp. Winton Diesels at 500 r.p.m., while the third is driven by a 4-cylinder, 4¾ in. x 8 in., 25-30 hp. Hill Diesel running at 550 r.p.m.

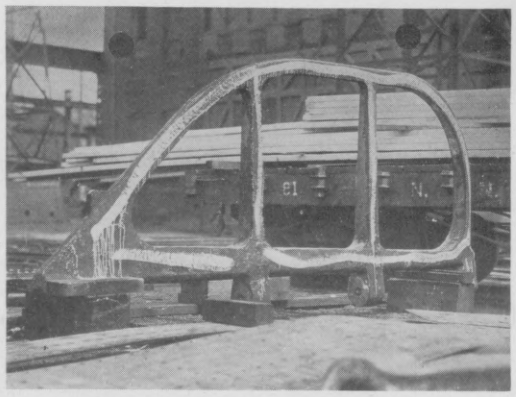
Power for the propulsion equipment is supplied by the main generators, while the auxiliary independent generators supply power for operating various ship's auxiliaries for lighting and for excitation.

Practically all of the electrical equipment is of G. E. manufacture. The main generators are of compound wound type, each rated at 410 kw., 200 r.p.m., 250 volt. The auxiliary generators on the shaft extensions are each rated 75 kw., 120 volt. Two of the remaining three are rated 60 kw., 120 volt., 550 r.p.m., while the third is rated 18 kw., 120 volt. The main motor drive is of double armature type consisting of two motors mechanically connected to operate as one. Each section is rated 500 hp., 120 r.p.m. and is shunt wound.

In order that shore power may be used when it is desired to shut down the vessel's main power plant there is an 18 kw. motor generator set comprising a d. c. generator and an a. c. motor. The main control of the propelling motor is of variable voltage type providing for engineroom control. The thrust bearing for the propeller shaft is of the G. E. spring thrust type.

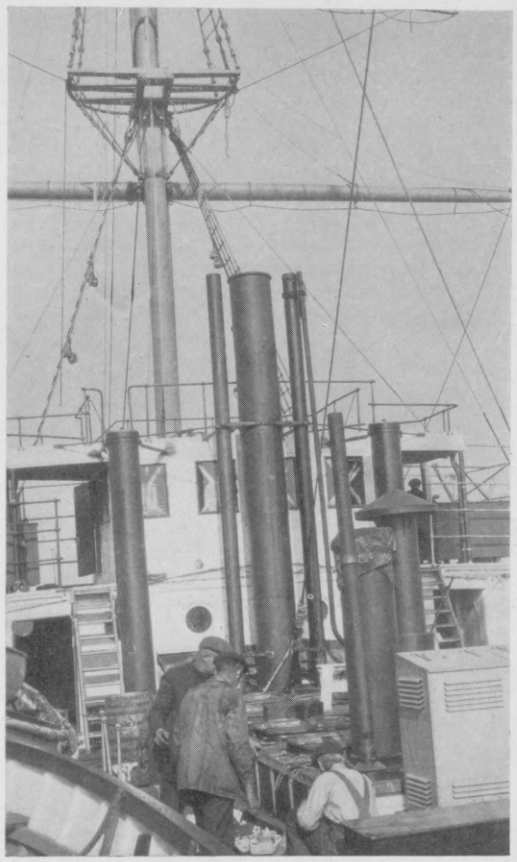
An interesting electric clutch arrangement has been fitted for the propelling element. Motor and shaft are rigidly bolted under normal conditions but when cruising at reduced power in the ice fields, bolts may be removed and the electric clutch used. This clutch will transmit a torque equivalent to 500 s.hp. at 95 r.p.m., but an excess will cause clutch slipping and will prevent undue stresses. For this reason, if the rotating propeller strikes solid ice, no damage will be done either to propeller or machinery because the magnetic clutch will take up the slip.

Auxiliaries on the ship are, as would naturally be expected, mainly electrically



The sturdy rudder frame

driven and these comprise for deck gear an anchor windlass of specially strong enclosed type and a gipsy supplied by American Engineering Co. Electricity is also used for

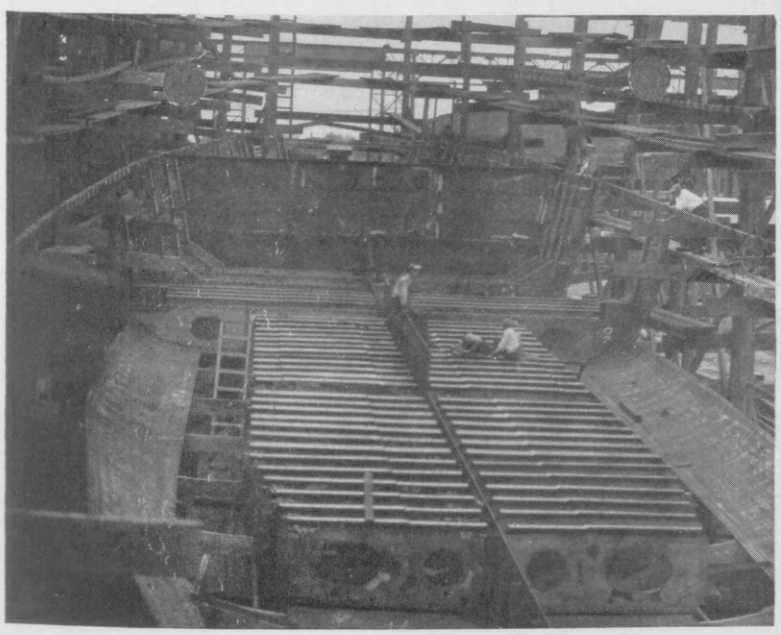


Diesel and heating boiler exhausts

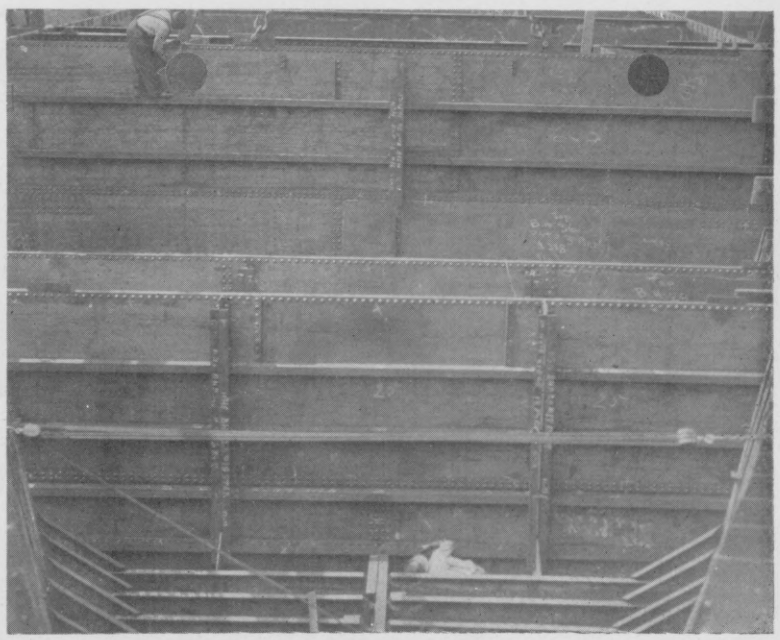
driving the machine shop tools, water circulating pumps, fire pumps, fresh water pumps, tank heater pumps, auxiliary air compressor, refrigerating equipment, boiler feed pump, fuel oil separator, lubricating oil separator and steering gear. These are driven by a total of 22 motors having an aggregate power of 189 hp. The main switchboard has three sections, one for power distribution, one for auxiliary generators and one for lighting.

The cutter NORTHLAND has a steel hull, and her general dimensions are as shown in the table; 200 ft. is about the limit on water line length for maneuvering in ice leads in the particular part of the Arctic in which the vessel is to operate. The draft is fixed at 15 ft. by the depth of water in a number of harbors the ship must visit. The beam and block coefficient have been influenced by the need of displacement to carry the weight of the hull structure. The cut-away fore-foot which is one of the most noticeable features of the vessel, has been provided in order to enable her to carry out ice-breaking duties if necessary. The lines of the hull generally present nothing abnormal and the midship section outline is one which would be expected for any ship of the size and speed. Very particular attention has been paid to watertight sub-division and the bulkheads are so spaced that the vessel will remain afloat with any compartment flooded. There is a double bottom fore and aft, and this is continued up the ship's side in way of the machinery, which considerably increases the vessel's ability to remain afloat under the most hazardous circumstances. One machinery space is completely cut off from its neighbor by a watertight bulkhead which is unpierced, so that it is necessary to go up on deck in order to proceed from one to the other.

NORTHLAND has two complete decks and a third deck continuous forward and aft of the machinery space. Midships on the weather deck is a sturdy superstructure containing at the fore end accommodations, and above this a pilot house, where are contained all the necessary apparatus for navigation including the radio compass. Just abaft the pilot house is arranged the stack for the heating boiler and two tall thin exhaust pipes from the main Diesels.



Construction in way of machinery space



Cofferdam bulkhead forward of machinery space

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This little group gives the ship a very snappy appearance which might easily have been spoiled by an ordinary sized stack.

The general features of the vessel and of her machinery space are well shown in the attached drawings. It will be seen that she has a fine entrance and equally fine run. She is handsome in appearance and her square rigged foremast is pleasantly reminiscent of earlier and less mechanical age at sea. Although smart and even yacht-like in appearance, the vessel is by no means yacht-like in construction, and both the designer and the shipyard should feel happy in having produced a ship which will certainly be able to stand up against any of the arduous duties she may be called upon to perform.

Ms. Northland Equipment

Thickness of Shell Plating:

W. L. strake, 1¼ in. from stem to fr. 7., 1⅛ in. from fr. 7 to fr. 68, 1 in. from fr. 68 to stern.

W. L. strake to main deck and W. L. strake to turn of bilge, 1 in.

Elsewhere, ½ in.

All frames below deck 16-inch web frames.

Characteristics of Machinery

Steering gear, electric-hydraulic.

Windlass and gipsy, 30 hp. electric motor drive.

2 main engines, 600 b.hp., 6 cylinders, 17 in. x 24 in., 200 r.p.m., McIntosh & Seymour.

2 auxiliary engines, 90 b.hp., 6 cylinders 6½ in. x 8 in., 500 r.p.m., Winton.

1 auxiliary engine, 4-cyl., 25 b.hp., 550 r.p.m., Hill.

2 main generators, 410 kw., 250 volts.

2 exciters, 75 kw., 120 volts.

2 auxiliary generators, 60 kw., 120 volts.

1 auxiliary generator 18 kw., 120 volts.

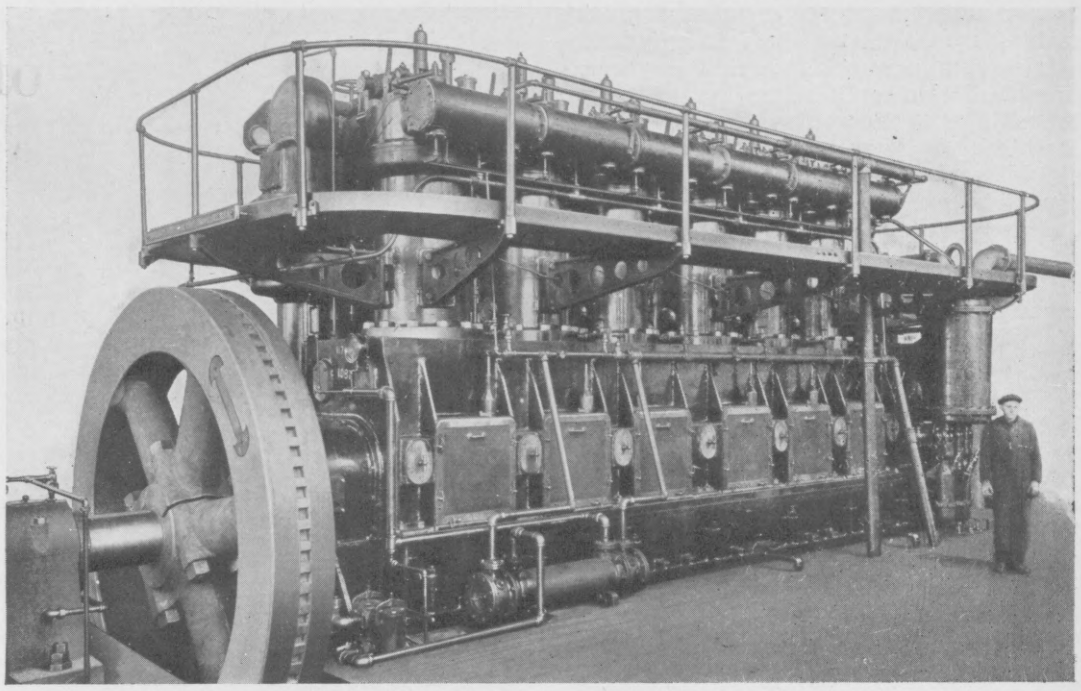
1 main motor, double armature, 1000 s.hp., 120 r.p.m.

1 motor-generator, 18 kw., 220 volts, a.c., 120 volts d.c.

The foregoing electrical machinery, main thrust bearing and thrust shaft, all auxiliary motors, main and auxiliary controls, all switchboards, and all power cables, General Electric Company.

Main engine silencers, McIntosh & Seymour Maxim.

Independent lubricators, Madison Kipp Tachometers and Pyrometers, Brown Inst. Co. Gauges, U. S. Gauge Co.



One of the two 600-hp. McIntosh & Seymour Diesels driving generators

Type of Capacity of Pumps

2 fire pumps, centrifugal, 250 g.p.m., 100 lb. pressure, Warren.

3 circulating pumps, centrifugal, 250 g.p.m., 35 lb. pressure, Warren. (These supply all low pressure salt water requirements.)

1 tank heater circulating pump, centrifugal, 35 g.p.m., 50 lb. pressure, Warren.

1 portable sump pump, Warren.

1 fuel oil transfer pump, screw, Quimby.

1 boiler feed pump, screw, Quimby.

1 boiler feed pump, hand, Goulds.

Other Machinery Equipment

14 bilge ejectors, Schütte & Koerting.

1 boiler injector, Schütte & Koerting.

1 refrigerating plant, 2-ton, York.

2 heating boilers, Coatesville Boiler Works.

1 air horn, Strombos.

1 auxiliary air compressor, Winton.

1 whistle air compressor, Westinghouse, Traction Brake Co.

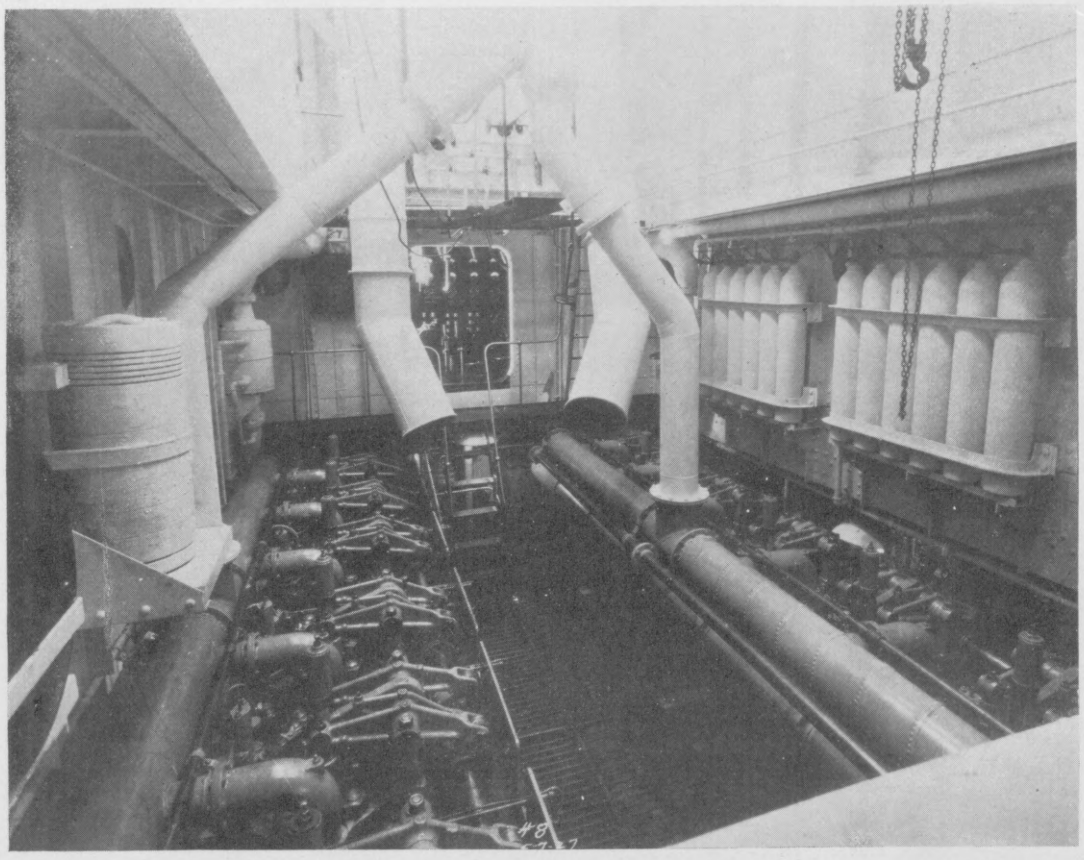
1 fire extinguisher system, Lux, Kidde.

1 hydro-pneumatic fresh water system, 500 gal., Meyers.

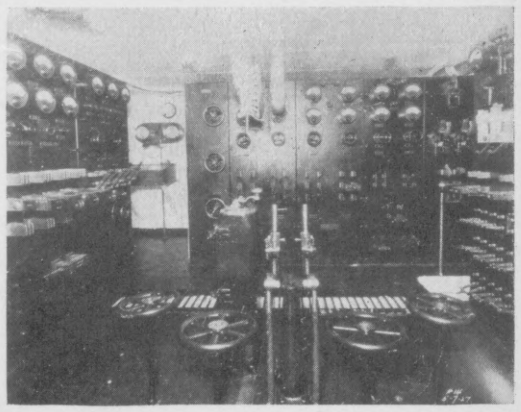
1 fuel oil purifier, De Laval.

1 lubricating purifier, De Laval.

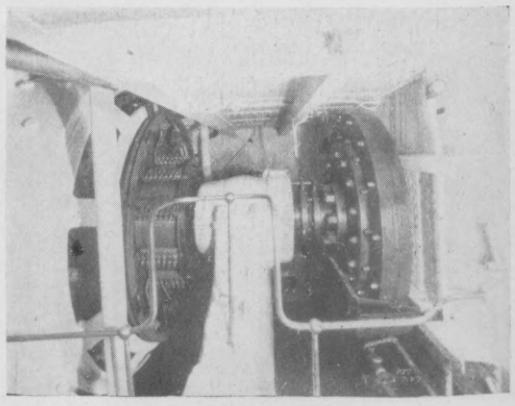
1 searchlight, 18 in., Sperry.



View of cylinder tops of ms. Northland's two main Diesels



Main switchboard and controls



Magnetic clutch on main motor

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Ms. Gripsholm's First Year of Operation

Big Motorship Has Shown Railroad Schedule on All Voyages, and Her Operation Has Been Characterized by Smooth Running

THE big Swedish-America motorliner GRIPSHOLM completed one year's successful service on the termination at Gothenburg of voyage No. 10 on November 18, 1926. Throughout the year she maintained her full schedule, had no trouble with her machinery and more than fulfilled the expectations of her owners. Burmeister & Wain, who were responsible not only for the construction of Ms. GRIPSHOLM'S main and auxiliary and propelling machinery, but also for the basic design upon which the B. & W. double-acting Diesel engine of today is based, have sent us a 32-page booklet containing a brief description of the facts underlying the GRIPSHOLM'S design, details of her log during the year's service and an extract of the log. In addition to this there is a very complete and detailed description of the main and auxiliary machinery and the passenger accommodations on the ship. The log extract we reproduce above. A detailed examination of this shows how well the expectations of the owners have been borne out by the way in which the ship functioned at sea. Her performance is most satisfactory.

When the late Dan Broström determined to build the GRIPSHOLM he wanted an economic, reliable, up-to-date motorship. The log shows well how his wishes were fulfilled. Ten complete voyages across the Atlantic from Gothenburg to New York and back were made between November 21, 1925, and November 18, 1926. In addition to this there was a Baltic cruise which occupied 5 days 1 hr. 59 min. from pier to pier. This was in July, 1926.

The "remarks" column in the log shows a complete absence of any notations of unnecessary stops at sea. Heavy weather, high seas and fog were responsible for most of the periods at reduced speeds or maneuvering. Both voyage No. 1, outward and homeward, show no time lost in reduced speed. The greatest amount of time lost was on voyage No. 7, outward in August, 1926, in which the total came to 26 hrs. 50 min., owing to foggy conditions. This, of course, is quite understandable at the time of the year in question. The record passage appears to have been the eastbound passage of voyage No. 1 when the vessel covered her total distance in 8 dys. 16 hrs. and 9 min. from pier to pier, the average speed being only ¼ knot short of 17 knots by the chart. The maximum average speed per 24 hrs. by the log was 16.95 knots and this speed was increased on one occasion to 17.3 knots.

The log analysis is necessarily brief and does not give any indication of the power developed, neither is this shown in any detail in the more complete data which follows the log analysis in the book. Some mention too of the auxiliary load and the power and fuel consumed by the auxiliaries is given in the more detailed log which follows. Fuel consumption at full and reduced speed are given under the heading "Diesel Machinery."

The book containing the voyage reports is a valuable document, historically as well as technically. It is a book of value to the industry because it shows that both the owners and the builders are confident in their ship, are proud of her, that the ship has done what they set out to have her do, and that they wish the industry in general to know it. Such commendable frankness could well be followed by other owners.

VOYAGE			TIME									SPEED			FUEL CONSUMPTION AT FULL AND REDUCED SPEED					WEATHER		REMARKS
			FROM PIER TO PIER			AT FULL SPEED			REDUCED SPEED		MANŒUVRING-STOP	KNOTS CHART	KNOTS LOG		DIESEL MACHINERY		GALLEY and HEATING BOILER		TOTAL	WIND	SEA	
No.	FROM/TO	DATE	Days	Hours	Min.	Days	Hours	Min.	Hours	Min.	Hours	Min.		Average	Max. average 24 h.	Tons	Tons 24 h.	Tons	Tons 24 h.	Tons 24 h.	Direction Power*	Direction Power*	*) Measured in »Beaufort« (Min. Average max.)
1	GOTHENBURG NEW YORK	21/11 25 30/11 25	9	4	43	8	19	20	0	00	9	23	16,05	16,35	17,3	513,4	57,6	63,8	7,15	64,75	Against 3—5—6	Against 2—5—6	
	NEW YORK GOTHENBURG	9/12 25 18/12 25	8	16	09	8	11	05	0	00	5	04	16,75	16,75	16,95	502,0	57,7	72,2	8,3	66,4	Against 2—3—5	Against 2—3—4	
2	GOTHENBURG NEW YORK	5/1 26 14/1 26	9	10	29	9	1	42	3	38	5	09	15,41	15,42	17,2	522,7	55,5	60,4	6,4	61,9	Against 4—7—9	Against 3—6—7	8/1—9/1 Reduced speed owing to heavy weather.
	NEW YORK GOTHENBURG	20/1 26 29/1 26	9	0	30	8	13	09	6	06	5	15	15,96	16,15	17,1	476,3	52,6	61,6	6,83	58,6	Astern 4—8—12	Astern 5—8—9	23/1 variable speed owing to fog. 24/1—30/1 Reduced speed. High sea. Governors working.
3	GOTHENBURG NEW YORK	13/2 26 23/2 26	10	9	02	9	9	54	17	31	5	37	14,2	14,2	16,65	517,9	51,1	77,6	7,65	58,8	Against 5—8—10	Against 3—6—7	16/2 17/2 20/2 23/2 Reduced speed. Heavy weather and high sea against.
	NEW YORK GOTHENBURG	27/2 26 8/3 26	8	16	35	8	11	36	1	05	3	54	16,85	16,9	17,3	469,45	55,1	62,62	7,34	62,45	Astern 2—3—4	Astern 2—4—6	8/3 Reduced speed, owing to fog.
4	GOTHENBURG NEW YORK	14/4 26 24/4 26	10	3	32	9	19	18	0	50	7	24	15,1	15,3	16,4	530,15	53,8	55,0	5,59	59,39	Against 2—4—6	Against 2—5—7	20/4 Manœuvring and stop order from Bridge. 23/4 Reduced speed, owing to fog.
	NEW YORK BOSTON GOTHENBURG	29/4 26 30/4 26 9/5 26	8	20	22	8	11	18	4	51	4	13	16,1	16,22	17,6	469,6	54,1	54,8	6,32	60,4	Variable 3—4—6	Variable 2—3—6	1/5 Stand by Boston 4 hours 3/5 Reduced speed, owing to fog.
5	GOTHENBURG NEW YORK	17/5 26 27/5 26	10	0	05	8	17	33	16	27	14	05	15,73	16,0	16,75	508,25	53,9	54,1	5,74	59,61	Against 1—3—8	Against 2—3—7	18/5 21/5 22/5 24/5 25/5 Reduced speed, owing to fog.
	NEW YORK GOTHENBURG	3/6 26 13/6 26	9	11	21	9	2	32	0	00	8	49	16,5	16,42	16,82	507,13	55,7	39,89	4,38	60,03	Variable 1—3—6	Variable 2—4—6	
6	GOTHENBURG NEW YORK	19/6 26 29/6 26	10	1	39	8	16	53	17	11	15	35	15,7	16,05	16,65	504,38	53,5	38,90	4,13	57,63	Against 2—4—7	Against 2—3—6	20/6 24/6 26/6 28/6 Reduced speed, owing to fog.
	NEW YORK GOTHENBURG	3/7 26 13/7 26	9	8	14	8	21	10	2	54	8	10	16,5	16,33	16,82	500,55	55,6	38,00	4,22	59,79	Astern 1—3—6	Astern 2—3—4	4/7 Reduced speed, owing to fog.
	GOTHENBURG HELSINGFORS STOCKHOLM MALMØ GOTHENBURG	15/7 26 26/7 26	5	1	59	4	5	53	0	00	20	06		16,30	16,85	220,60	50,4	16,15	3,46	53,87	Variable 0—2—6	Variable 1—3—6	
7	GOTHENBURG NEW YORK	29/7 26 7/8 26	9	17	32	8	9	16	26	50	5	26	15,55	15,80	16,72	461,04	50,7	36,75	4,05	54,75	Against 0—3—6	Against 2—4—7	4/8 5/8 7/8 Reduced speed, owing to fog.
	NEW YORK GOTHENBURG	11/8 26 20/8 26	9	2	44	8	20	49	2	11	3	44	15,80	15,91	17,40	463,98	51,8	37,30	4,16	55,92	Variable 0—3—4	Variable 2—5—7	12/8 13/8 Reduced speed, owing to fog.
8	GOTHENBURG NEW YORK	28/8 26 6/9 26	9	4	47	8	16	20	1	20	11	07	16,20	16,15	16,86	490,70	56,4	42,10	4,83	61,21	Against 0—4—7	Against 2—4—6	
	NEW YORK GOTHENBURG	11/9 26 20/9 26	8	21	15	8	13	32	4	00	3	43	16,20	16,10	16,40	493,33	56,5	41,70	4,79	61,29	Port 0—4—8	Port 2—4—7	20/9 Reduced speed and stop, owing to fog.
9	GOTHENBURG NEW YORK	25/9 26 4/10 26	9	3	10	8	17	36	1	40	7	54	16,06	16,06	16,53	504,83	57,4	50,80	5,78	63,13	Against 2—4—6	Against 2—4—7	3/10 Reduced speed, owing to fog.
	NEW YORK GOTHENBURG	9/10 26 18/10 26	9	3	49	8	18	04	5	43	4	02	15,70	15,77	17,0	516,15	57,4	52,57	5,85	63,23	Variable 0—5—9	Variable 2—5—8	13/10 Reduced speed, owing to fog.
10	GOTHENBURG NEW YORK	26/10 26 4/11 26	9	3	28	8	14	53	2	00	10	35	16,20	16,12	17,0	506,90	58,2	63,90	7,34	65,52	Variable 2—5—9	Against 3—5—8	1/11 Reduced speed, owing to fog.
	NEW YORK GOTHENBURG	9/11 26 18/11 26	8	20	28	8	12	41	1	10	6	37	16,47	16,40	16,83	501,50	58,5	52,80	6,15	64,40	Astern 2—4—8	Astern 2—4—8	10/11 Reduced speed and stop, owing to fog.

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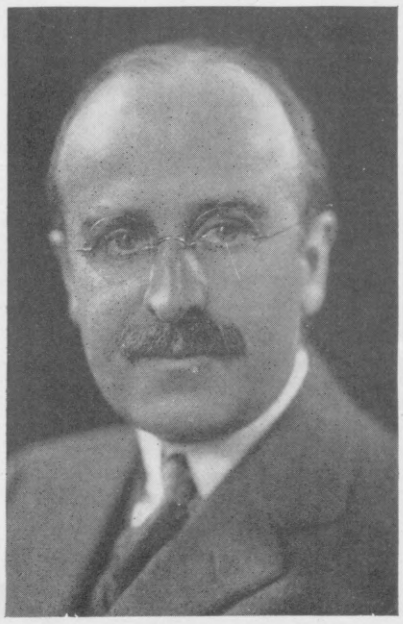
"Stage Coaches Won't Do"

Plummer's Statement Typifies Opinion of Progressive Shipowners on Steamers and Is Reiterated by Other Prominent Men

IN the last analysis it is the shipowner who is the deciding factor in the question of whether or not the motorship will largely displace the steamer on the high seas, as well as on domestic waterways. MOTORSHIP endeavors to present each month a fair picture of progress that is being made. The motorship antagonist probably regards many of our remarks as smacking of excess enthusiasm. It is gratifying, therefore, when we find prominent men in the shipping industry backing up our remarks and theories in eugolistic terms. Several shipowners lately have expressed themselves very satisfied with their motorships, and we have felt constrained to make a selection of a few recent instances. For example, J. P. Grace, President, W. R. Grace & Co., New York, in addressing the Pan-American Commercial Conference at



J. P. Grace, Grace Lines, forecasts fleets of fine passenger motorliners

Washington, D. C. on May 3, declared that the Panama Canal was a great boon to speedy communication between North American ports and southern destinations. "The trade was started with sailing vessels," he said, "and has been built up to its present proportion with steamers. *Now we are entering the era of Diesel vessels. It may be that the economy of the Diesel engine will, at some time in the near future, enable lines which now carry only freight to equip for freight and passenger service.*

The remarks of Edward C. Plummer, vice-chairman of the U. S. Shipping Board on returning from a recent South American tour are also as interesting as they are typical of present day thought. *"Stage coaches won't do,"* declared Mr. Plummer in referring to the present ships operated by the government in the South American trade. *"Diesel tonnage is necessary in this highly competitive trade, and in my report to the Shipping Board I will recommend replacing the present steamships with motorships."*

Lord Kylsant, White Star Line, says motorships are reliable and dependable

The opinions of Lord Kylsant, present owner of the White Star Line, are too well known to need further reiteration here. He is one of the most enthusiastic supporters of the Diesel engine and, as we remark elsewhere in this issue, one of his first acts on taking over the White Star Line has been to order a big Diesel driven passenger liner. Lord Kylsant visions the motor mammoth as a possibility of the not distant future.

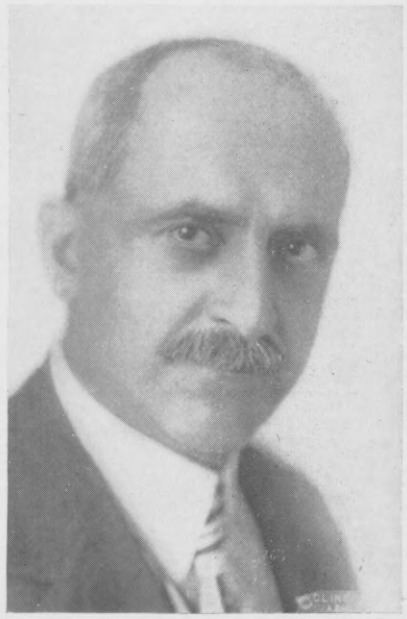
Sir Thomas Royden, chairman of the Cunard Line, on the other hand, while not quite so enthusiastic, unconsciously betrays his feeling that the Diesel engine is a prime mover whose existence the Cunard Line will soon have to acknowledge. "As to building new ships," he declared on his recent visit to New York, *"we feel that the great question is how to build—whether to put our new tonnage into steamships or motorships.* We are waiting to see the results of motorship tests; the potentialities of this later type are still unknown."

In regard to this latter remark it seems very definite that Lord Kylsant long ago realized these potentialities. In his presidential address to the Institute of Marine Engineers last year he said:

"As a result of my own 10 *years' experience of motor vessels, I am satisfied that the cost of upkeep and repair of Diesel engines is not too high compared with steam engines,* and while no definite basis can yet be laid down regarding the rate of depreciation, I do not think anything exceptional need be anticipated.

"The experience of shipowners who have operated motorvessels is, that they are both reliable and dependable. Contrary to expectation, they compare favorably with steamships in the matter of vibration, and, since no smoke is given off, the motor enables the vessel to be maintained in a better state of cleanliness."

He declared, furthermore, that owing to the motor occupying less room than the steam engine, especially in the faster vessels, and to the enormous reduction in bunker capacity, motorvessels can carry



Vice-chairman Plummer, U. S. Shipping Board, would replace existing steamers with motorships

larger cargoes than steamers of the same dimensions and speed, and that experience likewise shows that there can be a big saving in actual running costs.

"In ships of the same size and speed," he remarked, "Diesel engines consume a ton of oil, as against four or five tons of coal required by reciprocating steam engines, and normally, in the case of passenger vessels, a ton of oil costs about two and one-half times as much as a ton of coal. In cases where speed is all important," he told his audience, "the ratio of aggregate cost of higher speeds is less in motorvessels than in steamers, and while, in a coal-burning ship, increased speed means a bigger stokehold force, there is no such increase in the oil driven vessel."

Sir Thomas Royden would do well to realize some of these "unknown" potentialities, which were largely instrumental, for example, in increasing the net profits for the year ending December 31, 1926, of The United Molasses Co., London, by some

Sir Thomas Royden, Cunard Line, wondering whether to build motor Cunarders

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$220,000. The annual report of this company speaks eulogistically of *"the economical and satisfactory running of three new motor tankers,* of which the Company took delivery early in 1926.

"The ships," said F. K. Kielberg, chairman of the Company, *"have in every respect fulfilled our expectations, and more than justified our judgment that, for our particular trade, motor vessels would prove more economical and more efficient than steamers. In this connection I should like to emphasize that, while we are a trading Company, our success and prosperity very largely depend on our ability to provide the most economical means of transport and the best facilities for handling molasses cheaply and economically.* With this predominating feature as our guiding principle, and in view of the satisfactory results shown by our motorships, our directors last summer decided to place orders for two additional motor tankers of the same size and speed as the *Athelprince.* One of the new ships should be ready for delivery about November, and the second boat early next year."

In discussing the performance of Ms. CUBA MARU, one of their big motor freighters, Kawasaki Kisen Kaisha, the big Japanese shipowners state, in speaking of the vessel's performance: *"The fuel consumption is very low, only* 10½ *tons being consumed per day fully loaded which is equivalent in horse-power to what would be got out of* 35 *tons of coal, besides the advantage of less bulk and labor."*

The motorship's warmest and most enthusiastic friend is the shipowner, who, having found out for himself the economies of Diesel propulsion in one ship, proceeds to go ahead and order further vessels. No one can say that this is a case of smart salesmanship. Jas. Chambers & Co., a Liverpool firm engaged in trading on ocean trade routes with steamers and one motorship, the RABY CASTLE, powered by an 8-cylinder 3000 hp. North Eastern-Werkspoor Diesel, is now having two new motorships of about 9000 tons dw. constructed by Cammell Laird & Co., Liverpool. The ships will be built on the Isherwood longitudinal system and are intended for the New York-Far East trade. The choice of engines for the new ships has been based entirely upon the satisfactory performance given by the engine of ms. RABY CASTLE, engined by the North Eastern Marine Eng. Co., Wallsend-on-Tyne, England.

The owners have decided to use Diesel engines—says our Liverpool contemporary, *The Journal of Commerce*—as the result of their own actual experience and of that of their friends engaged in similar trades. The saving is not all apparent, and only experience can show wherein it lies.

For instance, loading up with the cheapest and best Diesel oil in the world at San Pedro, the itinerary followed by their vessels is from that port to the Far East, Philippines, China, Singapore, Japan, Java, and then onward through the Suez Canal to the United States, where they discharge and load. Comparatively cheap and good oil is obtainable at many points on the route.

The journey is then continued from the States through the Panama Canal, and the vessels comprising the fleet then start afresh, so far as bunkering is concerned, at San Pedro, Cal., completing the cycle.

To a very large extent these ships are substituting for dear and bad coal the best types of Diesel oil and consuming in the main engines only one-fifth of the bunkers required in the case of coal, thus leaving free both space and deadweight in the ship for the legitimate purposes of cargo of every description. There are also various deep tanks fitted which can carry liquid cargo such as liquid rubber, cocoanut oil, palm oil, etc., if such cargo offers; if not, the same tanks can be filled with general cargo of any description.

There are other hidden savings which are not generally appreciated by the bulk of shipowners, one being that there is no cleaning of fires, which, in the case of a steamboat, reduces the average speed by about 8/10 per cent. That is to say, that, granted two similar ships, one steam driven and the other with Diesel engines, if the steam engine could be expected to do, say, 12 knots, the Diesel engine would undoubtedly average over 12½ knots granted the equivalent i.h.p.

It is an undoubted fact that the upkeep, deck and engine stores, paint, etc., is much reduced in comparison with that of a steam engine. There are no boilers to keep up, no furnaces to be renewed or bunkers to be constantly looked after, and it is also found that paint lasts a great deal longer in the case of a Diesel engined boat than that of steam engines.

Motorship's Speedy Passage

Reports have reached the General Steamship Corporation offices at San Francisco that Ms. SILVERFIR, first vessel in the Kerr lines service to proceed direct from Los Angeles and San Francisco to the Dutch East Indies, arrived in Macassar on May 1, 30 days after sailing from San Francisco. She sailed from Macassar on May 4, and was due to arrive in Soerabaya on May 8.

This fast time to the Dutch East Indies is already stimulating considerable interest in the trade with that rich market, according to H. S. Scott, president of the General Steamship Corporation. Heretofore it has been necessary to transport goods destined to these markets at Hongkong and Singapore. Shippers now, however, not only have a direct service, but a rapid service, greatly contributing to the upbuilding of trade relations with that territory.

The East Indies trade is a comparatively new development for West Coast trade and local shippers are hoping to see a new and large market opened up there.

More Motorship Records

The motorship BRANDANGER recently reduced her own former record time between Brazil and Los Angeles harbor to 26 days when she completed her first round voyage in the coffee trade between the east coast of South America and the Pacific, in which she claims the speed record.

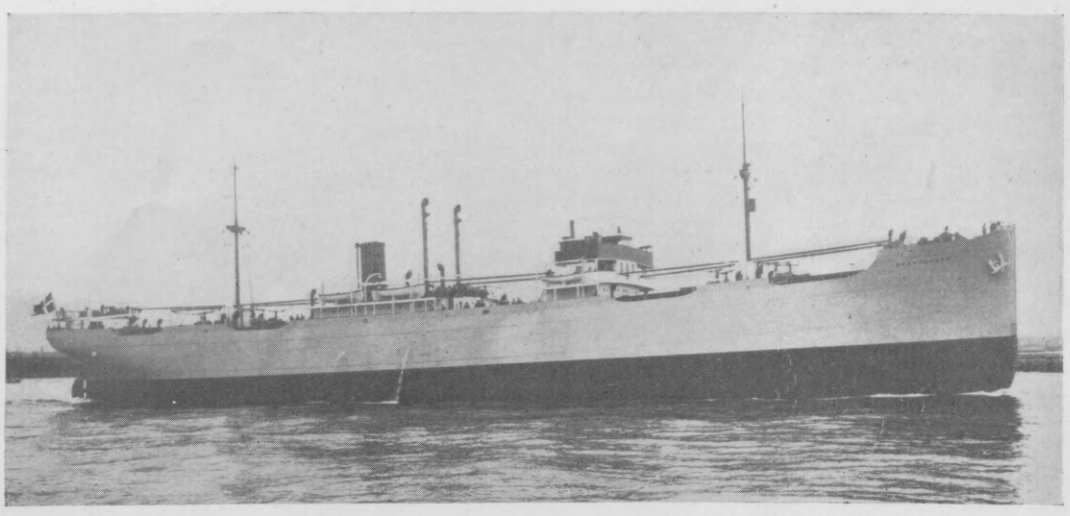
Discussing Ms. BRANDANGER'S latest performance, Harry S. Scott, president of the General Steamship Company, agents of the Westfal-Larsen Line, according to the San Francisco Shipping Gazette said:

"With constant improvements inaugurated in the past few years for bringing Brazilian coffee to American markets, we are reminded of the romantic clipper days when teas and spices were rushed to our shores and one master vied with another to be the first to reach his goal.

"Coffee has now become far more important to America's table than tea, and the trade with Brazil takes on increasing importance every year. We are proud to be able to introduce fast Westfal-Larsen ships of BRANDANGER and HOYANGER type, affording our Pacific Coast merchants the very best ships marine engineers can offer.

Norwegian owners are having 51 ships built of which 21 are Diesel-driven tankers, according to a report received at the Department of Commerce from the Secretary to the American Commercial Attache at Oslo.

Shipbuilding for Norwegian account on April 1 of this year totaled 51 ships with 241,100 gross tons, of which 21 ships were tankers, of 144,000 gross tons, equipped with Diesel motors. Orders for nine ships of 5,200 tons were placed in Norway, and other orders were placed in the following countries: Sweden 12 ships of 70,850 tons, Germany 10 ships of 61,500 tons, Denmark 8 ships of 50,100 tons, France 5 ships of 17,800 tons, and the Netherlands one ship of 9,000 tons.



Ms. Brandanger, record-breaking motorfreighter in the Los Angeles-Brazil coffee trade

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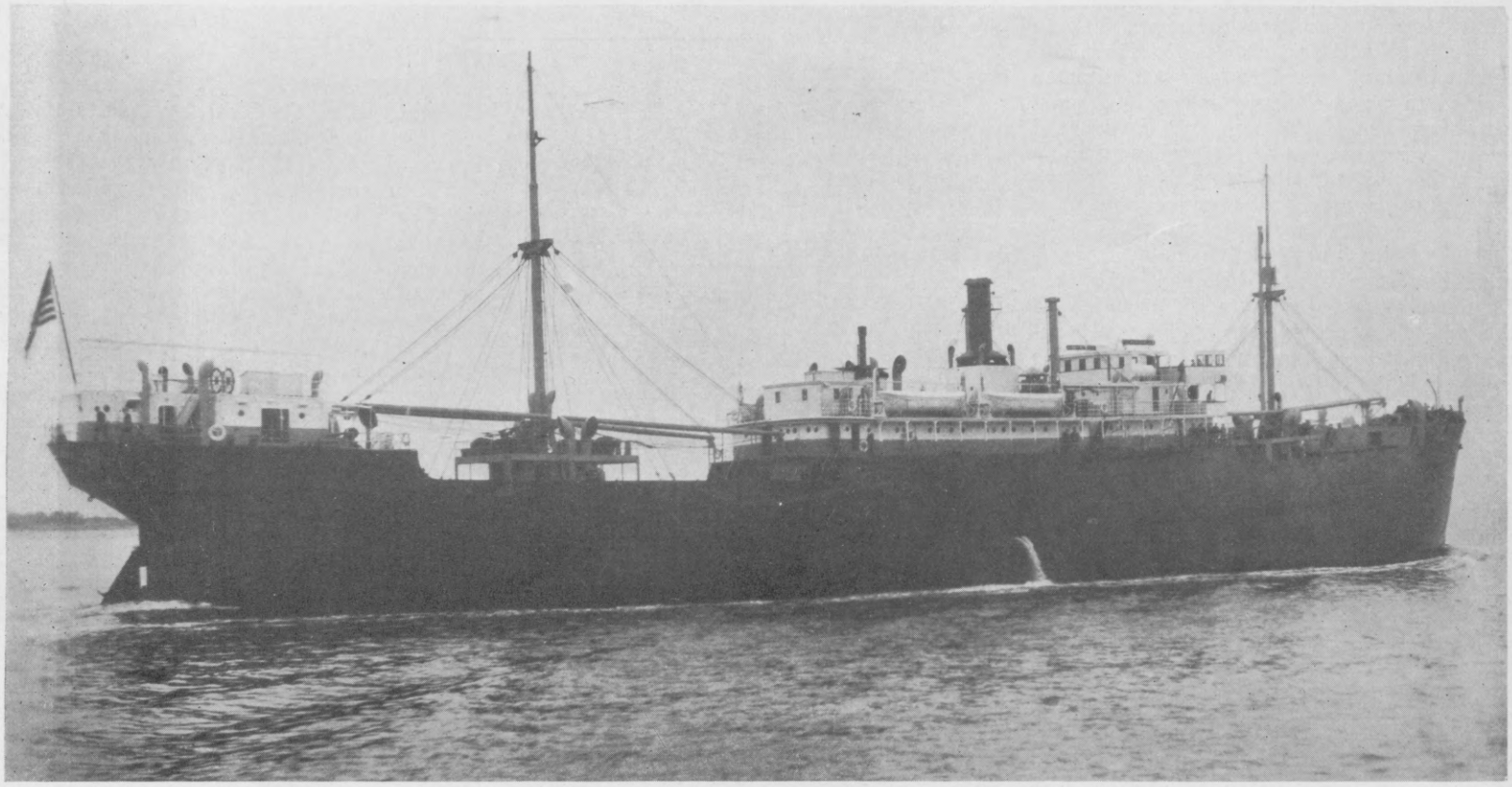
Converted Ms. City of Rayville Completed

Another Shipping Board Boat Converted and Placed in Immediate Service for Heavy Round the World Service

EARLY in the morning of April 29th Ms. CITY OF RAYVILLE moved up New York Harbor and alongside Pier No. 4, Army Base, Brooklyn. She is the eighth steamer to be converted to a motorship by the U. S. Shipping Board. A war product of Oscar Daniels Company of Tampa, Fla., Admirals of the U. S. Navy, prominent shipping men and manufacturers' representatives. Immediately after her trials the boat was turned over to the Roosevelt Steamship Lines.

The ship left Old Point Comfort at 6 A. M. on April 28 and arrived at Quarantine Station, New York, about 3 A. M. on the 29th. Her average speed from bar to bar was slightly over 13 knots, with the propeller turning about 88 r.p.m. The normal speed is 90 r.p.m. During the sea trials and the run to New York her engines performed perfectly and her operators have evidenced their confidence in the propelling equipment by making her "shake down" cruise a trip around the world.



Shipping Board Motorship City of Rayville which has now joined the Roosevelt fleet of up-to-date freighters in round the world service

Ms. CITY OF RAYVILLE never made a trip as a steamer. Newport News Shipbuilding & Dry Dock Company removed the steam plant, put in new foundations, installed new Diesels and auxiliaries, electric deck equipment, and rebuilt the super-structure according to plans of the Maintenance and Repair Division of the Shipping Board.

The main engine is a Busch-Sulzer Diesel of 3,000 s.hp. at 90 r.p.m. which power it develops on a conservative rating. Three Worthington 115 b.hp. auxiliary engines drive 75 kw. generators and air compressors large enough for their own requirements and for the main engine as well in case of emergency.

Ms.CITY OF RAYVILLE and her equipment is an exact duplicate of Ms. SAWOKLA described in MOTORSHIP for April, 1927. She is to be followed by the CITY OF DALHART and YOMACHICHI now being converted by Newport News. All four ships are driven by Busch-Sulzer main engines. This yard also converted the TAMPA and UNICOI for the Shipping Board, these ships having Worthington double-acting engines.

The sea trials of the CITY OF RAYVILLE were entirely successful and were attended by about one hundred interested observers including Shipping Board officials, two

Characteristics of Ms. City of Rayville

Gross register	5878 tons
Net register	3689 tons
Length overall	416 ft. 0 in.
Length b.p.	402 ft. 0 in.
Beam, molded	54 ft. 0 in.
Depth, molded to main deck	33 ft. 9 in.
Displacement load	13,010 tons
Mean draft at above	26 ft. 10¾ in.
Power—main engine	3000 s.hp.
Service speed (about)	11½ knots
Total deadweight capacity	9125 tons
Fuel oil, double bottom	760 tons
Cargo spaces (bale)	455,660 cu. ft.
Cargo spaces (grain)	448,030 cu. ft.
Deep tanks (liquid)	1053 tons

The boat has loaded in New York, and was scheduled to leave on May 10th, and proceed via the Panama Canal to Australia, India, the Suez and on around to New York requiring about 5½ months to make the trip. Splendid accommodations have been provided for 14 passengers in outside cabins affording an excellent opportunity to manufacturers' representatives and pleasure seekers to see the world, with appreciable stops at the principal ports of call. Captain Nils Leknes is in command with Chief Engineer A. T. Engegretsen and a staff of unusually capable assistants.

Roosevelt Steamship Lines now have the motorships WEST HONAKER, WEST CUSSETA, CROWN CITY, TAMPA, UNICOI and CITY OF RAYVILLE in their Australian and Far Eastern service and will be in excellent position to meet the strong competition of foreign concerns already employing economical motorships in this trade.

The Merchant Fleet Corporation has allocated the motorship WILLIAM PENN, formerly operated by the American Pioneer Line in the Far East service, to the Roosevelt Steamship Company.

Four motorships for Horn Line service between Northern Europe and Northern South America are under construction. The first of them will be ready about October 1, 1927, and the remaining three will enter service during the spring of 1928. These vessels will be of 4,600 gross tons, will have accommodations for 36 first-class passengers, and will be capable of maintaining a speed of about 12½ knots.

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Sea-Going Hopper Dredge "Willets Point"

Discussion on Novel Features Incorporated in New Vessel's Design and Construction Continued from the May Issue of Motorship

By Northrop R. Fletcher*

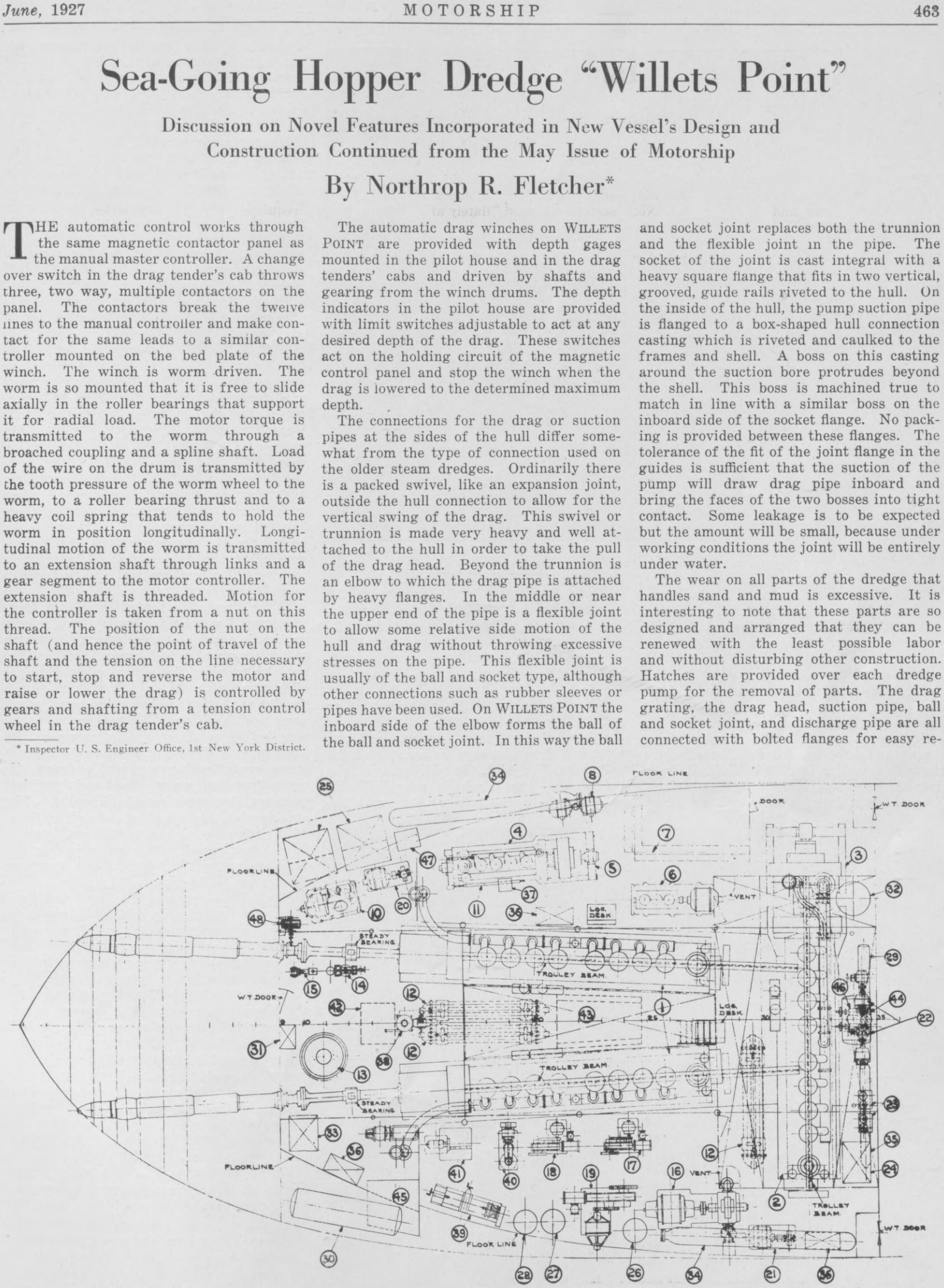
THE automatic control works through the same magnetic contactor panel as the manual master controller. A change over switch in the drag tender's cab throws three, two way, multiple contactors on the panel. The contactors break the twelve lines to the manual controller and make contact for the same leads to a similar controller mounted on the bed plate of the winch. The winch is worm driven. The worm is so mounted that it is free to slide axially in the roller bearings that support it for radial load. The motor torque is transmitted to the worm through a broached coupling and a spline shaft. Load of the wire on the drum is transmitted by the tooth pressure of the worm wheel to the worm, to a roller bearing thrust and to a heavy coil spring that tends to hold the worm in position longitudinally. Longitudinal motion of the worm is transmitted to an extension shaft through links and a gear segment to the motor controller. The extension shaft is threaded. Motion for the controller is taken from a nut on this thread. The position of the nut on the shaft (and hence the point of travel of the shaft and the tension on the line necessary to start, stop and reverse the motor and raise or lower the drag) is controlled by gears and shafting from a tension control wheel in the drag tender's cab.

* Inspector U. S. Engineer Office, 1st New York District.

The automatic drag winches on WILLETS POINT are provided with depth gages mounted in the pilot house and in the drag tenders' cabs and driven by shafts and gearing from the winch drums. The depth indicators in the pilot house are provided with limit switches adjustable to act at any desired depth of the drag. These switches act on the holding circuit of the magnetic control panel and stop the winch when the drag is lowered to the determined maximum depth.

The connections for the drag or suction pipes at the sides of the hull differ somewhat from the type of connection used on the older steam dredges. Ordinarily there is a packed swivel, like an expansion joint, outside the hull connection to allow for the vertical swing of the drag. This swivel or trunnion is made very heavy and well attached to the hull in order to take the pull of the drag head. Beyond the trunnion is an elbow to which the drag pipe is attached by heavy flanges. In the middle or near the upper end of the pipe is a flexible joint to allow some relative side motion of the hull and drag without throwing excessive stresses on the pipe. This flexible joint is usually of the ball and socket type, although other connections such as rubber sleeves or pipes have been used. On WILLETS POINT the inboard side of the elbow forms the ball of the ball and socket joint. In this way the ball and socket joint replaces both the trunnion and the flexible joint in the pipe. The socket of the joint is cast integral with a heavy square flange that fits in two vertical, grooved, guide rails riveted to the hull. On the inside of the hull, the pump suction pipe is flanged to a box-shaped hull connection casting which is riveted and caulked to the frames and shell. A boss on this casting around the suction bore protrudes beyond the shell. This boss is machined true to match in line with a similar boss on the inboard side of the socket flange. No packing is provided between these flanges. The tolerance of the fit of the joint flange in the guides is sufficient that the suction of the pump will draw drag pipe inboard and bring the faces of the two bosses into tight contact. Some leakage is to be expected but the amount will be small, because under working conditions the joint will be entirely under water.

The wear on all parts of the dredge that handles sand and mud is excessive. It is interesting to note that these parts are so designed and arranged that they can be renewed with the least possible labor and without disturbing other construction. Hatches are provided over each dredge pump for the removal of parts. The drag grating, the drag head, suction pipe, ball and socket joint, and discharge pipe are all connected with bolted flanges for easy re-



Machinery arrangement of sea-going hopper dredge "Willets Point" shows position of two main engines and 'thwartships Diesel generator

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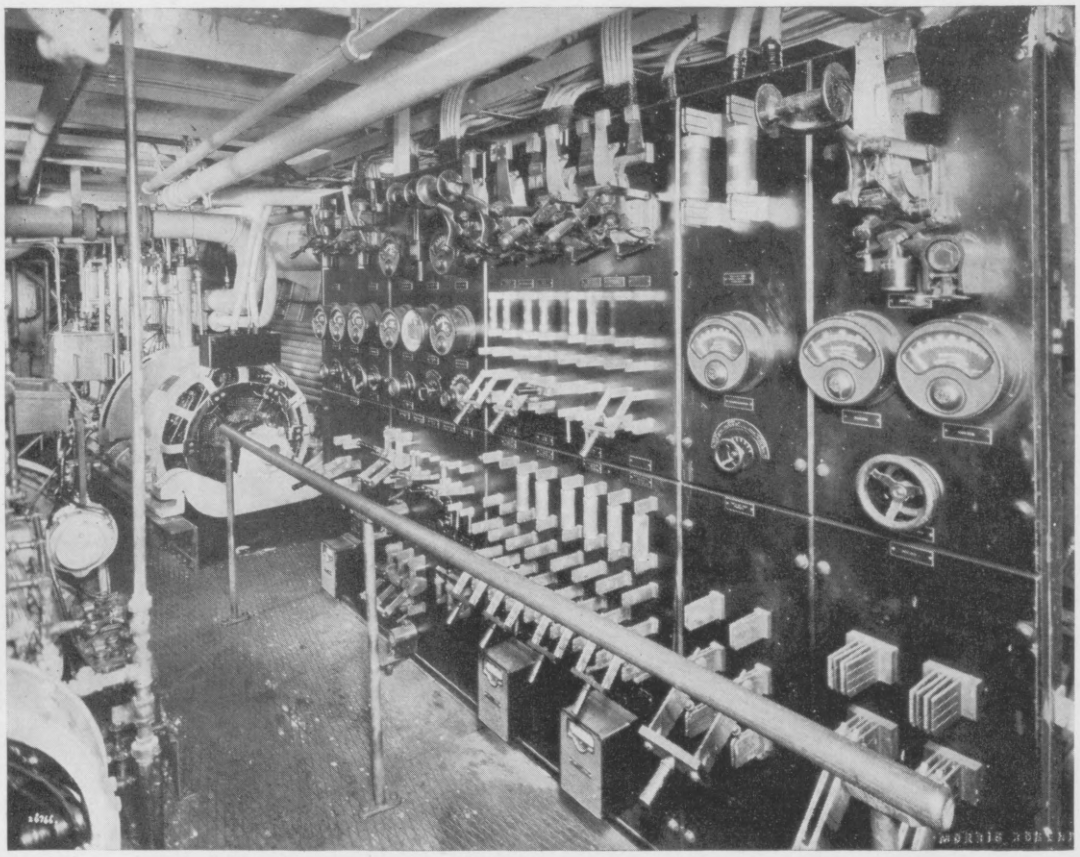


Main switchboard in the U. S. Engineers hopper dredge "Willets Point"

newal. For the same reason the hull connection casting is provided with a hard, cast steel, spool liner that is held in place with tap screws.

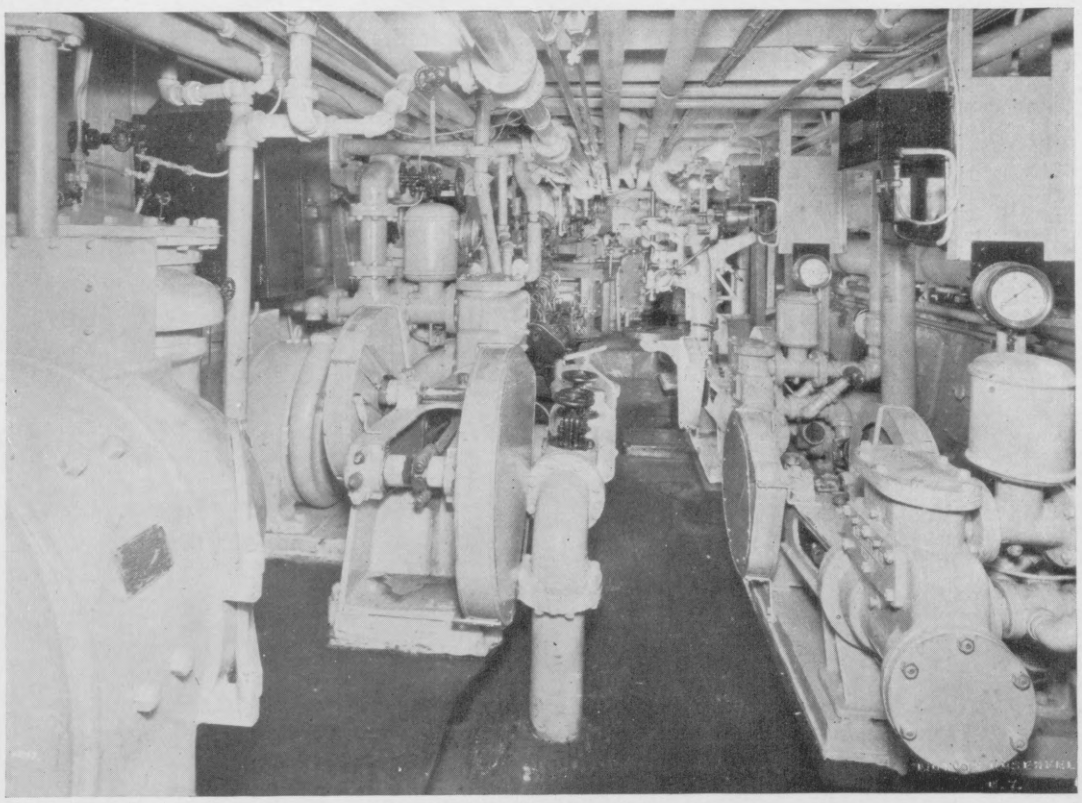
For removal of the ball and socket joint from the guides a heavy davit made of channels and plates is provided. Two tackles are supported from the head of the davit. The inner tackle is attached to the socket and flange casting, the outer tackle supports the elbow and ball. The wires for these two tackles lead to a divided single drum of a motor driven spur-geared winch. To unship the drag pipe, the ball and socket joint is drawn up in the guides by the forward davit and winch. The drag winch and davit, aft, hoist the drag head at the same time. Both davits are swung inboard on horizontal pin connections at the deck so that the whole pipe can be lowered to the deck.

In operation, with the pipe lowered to position over the side, the outer tackle of the forward davit must support the elbow or it will drop sideways on account of the ball and socket joint. In addition to a solenoid brake, the winch is provided with pawls to hold the wires. To avoid the necessity of adjusting and maintaining the two tackles at an equal length an adjusting screw with a handwheel and lock nuts is provided for connection of the outer, upper sheave to the davit head.

All controllers and motors for deck machinery are watertight. An anchor windlass forward and a capstan aft, both furnished by the Hyde Windlass Company, are of the standard type, except that the head of the capstan was shortened in order to preserve the clearance line. A Strombos "Quadruplex" whistle and a Sperry "Typhon" whistle are installed. For a visible signal a steam jet is provided with the pull attached to the pull of one of the whistles.

In addition to an auxiliary high pressure air compressor, a rather large motor driven low pressure air compressor is installed. This machine furnishes pressure for blowing out choked sea chests. for operating sewage ejectors, for operating water pressure tanks and boiler pumps in an emergency, and for operating pneumatic tools. Hose connections for pneumatic tools are provided in several places in the engine room and the pump room. These tools should be very useful. They will save time and labor in scaling, chipping and other such work. A number of jobs can be handled by the crew that would ordinarily be left for the pneumatic tools of the shipyard when the dredge goes in for general repairs. The machine tool and tool equipment is very complete.

The dredge is heated by steam from a vertical fire tube donkey boiler. A connection is provided on deck for a steamhose to the pumps of a fuel barge. Connections are also provided for steaming out the fuel oil bunkers. The "Lux" CO_2 system is used for fire protection in the engine room, pump room and bunkers. The fire main can be supplied from either the jet pump or the bilge pump. The jet pump is an 8 in. single stage centrifugal pump which draws directly from its own sea chest and furnishes pressure for scouring the hoppers. The strainer for this sea chest, as well as those of the other sea chests on the boat, is made with a coating of rubber vulcanized to the metal to prevent barnacles from attaching themselves to the plate.



Arrangement of pumps and auxiliary machinery in the engine room

The bilge pump and the fresh and sanitary water pumps are of the reciprocating type. The sanitary water and fresh water pumps discharge into pressure tanks and are controlled with pressure switches for automatic stopping and starting in the same manner as the hydraulic pressure pumps for the hopper door gear. Two rotary pumps are provided as transfer pumps for fuel oil and lubricating oil. Reciprocating circulating water and lubricating oil pumps are attached to each engine. Provision is also made for circulating oil and water through any engine from any of the direct connected pumps of the other engines or from the independent oil transfer pump and the fire line.

WILLETS POINT is a ship of special design to meet the requirements of a severe and highly specialized service. Provision has been made in the equipment so that the boat can be used on any work that can be done by the hopper type of dredge, although on some few projects a larger dredge may be more economical. In the dredging machinery, efficiency of operation and low

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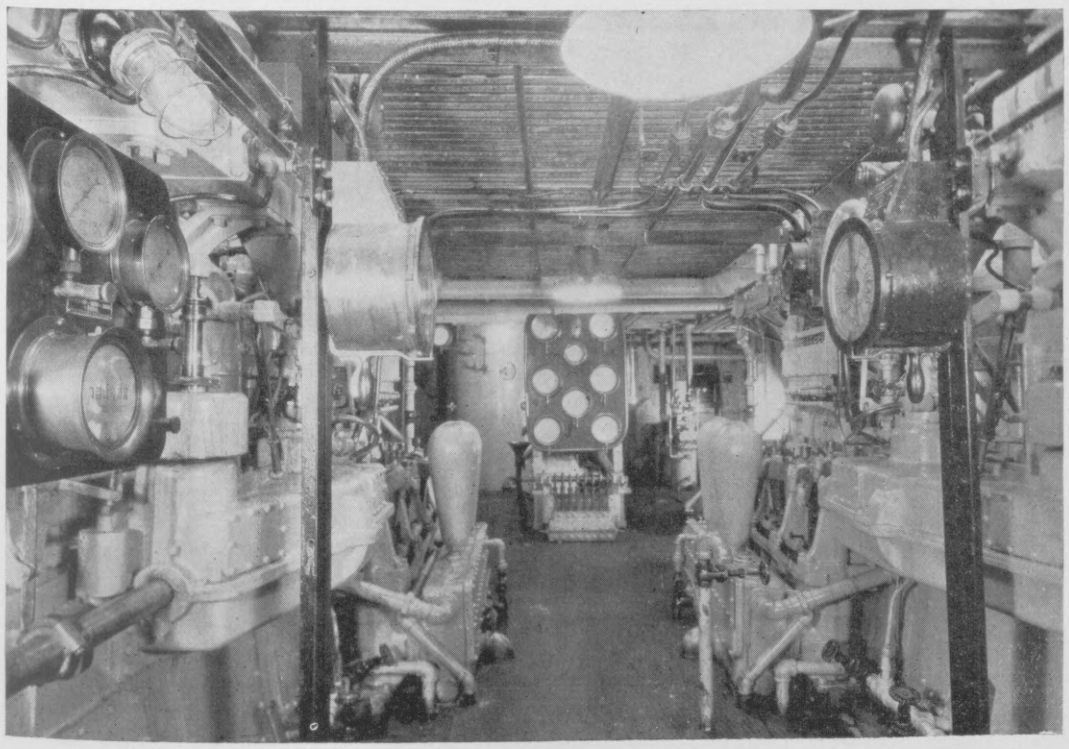
Mechanical and Electrical Equipment of U. S. Army Engineers Dredge Willets Point

Item	Name of Unit	No. of Units	Make	Description and Characteristics
1	Propelling engines	2	Winton	8-cyl., 450 hp., 250 r.p.m., trunk piston.
2	Generator (main)	1	Winton-Westinghouse	325 kw., 230 volt d.c. compound generator; 8-cyl., 275 r.p.m. engine.
3	Generator (auxiliary)	1	Winton-Westinghouse	65 kw., 230 volt d.c. compound generator; 4-cyl., 450 r.p.m. engine.
4	Generator (auxiliary)	1	Hill-G.E.	12 kw., 230 volt d.c. compound G. E. generator; automobile type starter; 3-cyl., 550 r.p.m. engine.
5	Switchboard	1	General Electric	7 panel, live front, 3-buss with double throw switching; main or auxiliary or lighting buss.
6	Balancer set	1	General Electric	5 kw., 230-115 volt.
7	Storage battery	1	Edison	120 volt, 450 amp. hr.
8	Wireless transmitter	1	General Electric	½ kw., continuous wave.
9	Searchlight	1	General Electric	18 in., 35 amp.
10	Air compressor, H.P. (auxiliary)	1	Winton	3-stage, 2,400 r.p.m., compound water cooled, 1,000 lb. per sq. in.
11	Air compressor, L.P. (auxiliary)	1	General Electric	2-stage, 2,400 r.p.m. G. E. air cooled, 100 lb. per sq. in., 110 cu. ft. per min.
12	Donkey boiler, (heating only)	1	Federal	Vert., fire tube, 100 lb. per sq. in., 216 sq. ft., Staples & Pfeiffer fuel oil burning system.
13	Boiler fuel pump	1	Staples & Pfeiffer	3 in. x 2 in. x 4 in. steam duplex, 10 g.p.m.
14	Boiler feed pump	1	Worthington	Steam single, 3½ in. x. 2¼ in. x 4 in.
15	Service pump	1	Worthington-G.E.	Centrifugal, 2 stage, 150 g.p.m., 85 lb. per sq. in., 20 hp. motor.
16	Fire and jet pump	1	Worthington-G.E.	Centrifugal, single stage, 2000 g.p.m., 75 lb. per sq. in., 125 hp. motor.
17	Bilge pump	1	Deming-G.E.	Reciprocating, 8 in. x 10 in., 213 g.p.m., 75 lb. per sq. in., 20 hp. motor.
18	Sanitary pressure pump	1	Deming-G.E.	Reciprocating, 5 in. x 6 in., 55 g.p.m., 45 lb. per sq. in., 5 hp. motor.
19	Fresh water pressure pump	1	Deming-G.E.	Reciprocating, 5 in. x 6 in., 55 g.p.m., 45 lb. per sq. in., 5 hp. motor.
20	Lub. oil transfer pump	1	Northern-G.E.	Rotary, 2 in., 60 g.p.m., 45 lb. per sq. in., 3 hp. motor.
21	Fuel oil transfer pump	1	Northern-G.E.	Rotary, 2 in., 50 g.p.m., 100 lb. per sq. in., 7½ hp. motor.
22	Hydraulic pressure pump	2	Hele-Shaw-Westinghouse	400 lb. per sq. in., 3 hp. motor.
23	Donkey boiler injector	1	Metropolitan	½ in.
24	Sewage ejectors	2	Ansonia	50 gal. cast iron tank, pneumatic, automatic.
25	Dredge pump (stbd.)	1	Federal-G.E.	Centrifugal, 15 in., lined, compound, open, U. S. Engr. Dept. design, 200 hp.
26	Dredge pump (port)	1	Federal-G.E.	Centrifugal, 15 in., lined, compound, open, U. S. Engr. Dept. design, 400 hp.
27	Drag heads	2	Federal	15 in., U. S. Engr. Dept. design.
28	Anchor windlass	1	Hyde-G.E.	1½ in. stud link, spur gear, 25 hp. motor.
29	Capstan	1	Hyde-G.E.	10,000 lb., 30 ft. per min., spur and worm reversing, 20 hp. motor.
30	Steering gear	1	Hyde-G.E.	7 in. pistons, 6 hp. motor, hydro-electric telemotor.
31	Drag head winch	2	Lidgerwood-G.E.	Worm drive, automatic tension, 16 in. x 20 in. drum, 7200 lb., 75 ft. per min., 25 hp. motor.
32	Drag pipe winch	2	Lidgerwood-G.E.	Spur gear, 16 in. drum, 25 ft. per min., 10 hp. motor.
33	Refrigerator	1	Brunswick-G.E.	CO_2 direct expansion, 1 ton, 2¼ in. x 4½ in. compressor, 7½ hp. motor.
34	Refrigerator cond. circulating pump	1	Brunswick-G.E.	Centrifugal, 1½ in., 1 hp. motor.
35	Ventilating fans	2	American Blower-G.E.	450 cu. ft. per min., 1 in. pressure, ¼ hp. motor.
36	Ventilating fans	2	American Blower-G.E.	750 cu. ft. per min., 1½ in. pressure, ½ hp. motor.
37	Lub. oil separator	1	De Laval	100 gal. per min., 2 hp. G. E. motor.
38	Lathe	1	South Bend	18 in. x 26 in. x 6 in., 2 hp. G. E. motor.
39	Drill press	1	Barnes	22½ in., vertical, 1 hp. G. E. motor.
40	Grinder	1	Wilmarth and Norman	Two 10 in. x 1 in. wheels, 2 hp. G. E. motor.
41	Whistle	1	Strombos	Quadruplex.
42	Whistle	1	Sperry	Typhon.
43	Fire extinguishing system	1	Walter Kidde	Three 50 lb. cylinders for fuel oil bunkers.
44	Fire extinguishing system	1	Walter Kidde	Four 50 lb. cylinders for engine and pump rooms.



Main engine controls on the U. S. Army dredge "Willets Point"

upkeep have been the aim of the design. Flexible and automatic controls will reduce labor and increase the dredging efficiency. The power plant with all mechanical and electrical equipment is compact and very complete. Such a plant will be well worth watching when comparative figures of costs are tabulated.

Motorliner's Fine Performance

Completed in 1923 the British India S. U. Co's motorliner DALGOMA, which had the largest 2-cycle Diesel engines built in Great Britain up to that time has been at sea for nearly 4 years, mostly on the Indian Coast, and has run with the utmost regularity. In her last year's work, before returning to Great Britain, she covered 50,000 miles with never more than 24 hours in port, and without any stop of the main engines at sea.

For the first time since its organization in 1920 Inland Waterways Corporation in 1926 showed an operating profit. Total revenue last year was $5,179,274, resulting in a net profit of $219,511, compared with a $4,010,000 revenue total and a net operating loss of $34,519 in 1925.

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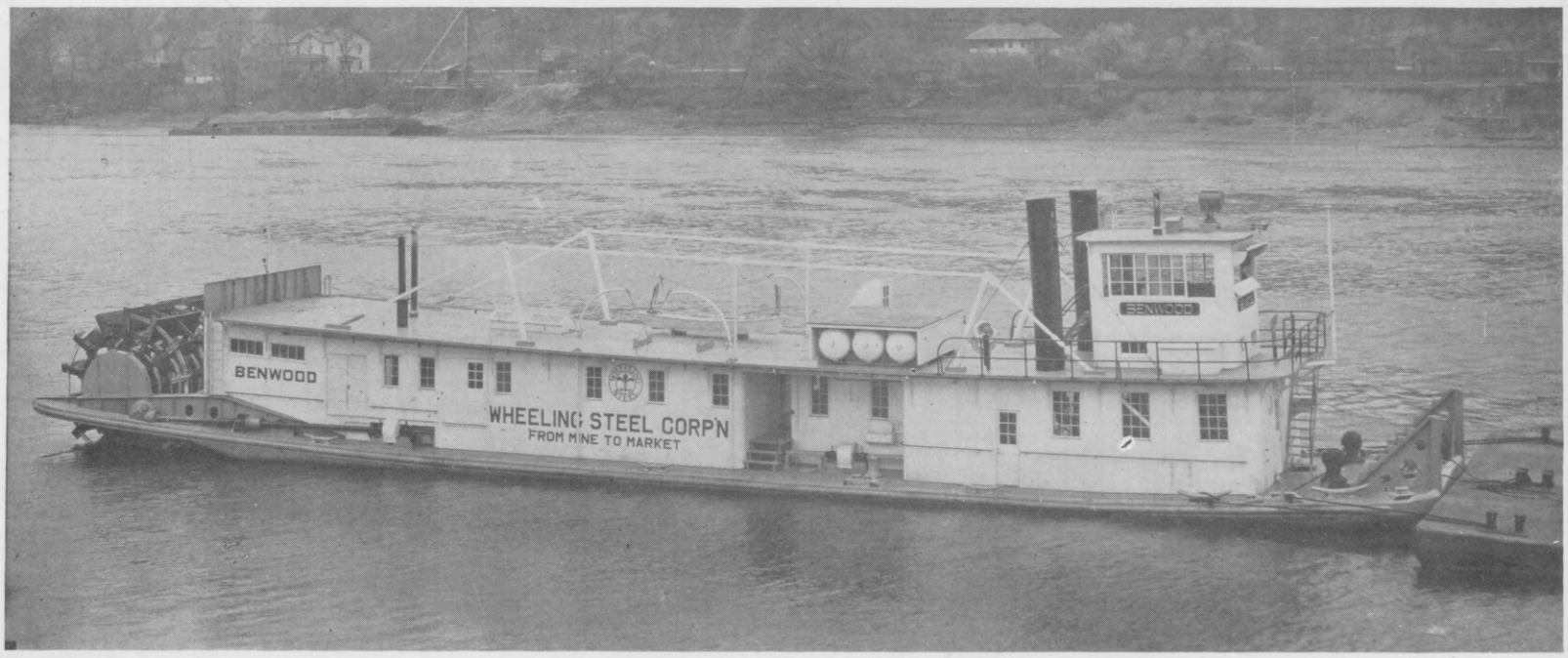


River Towboat with Novel Wheel Drive

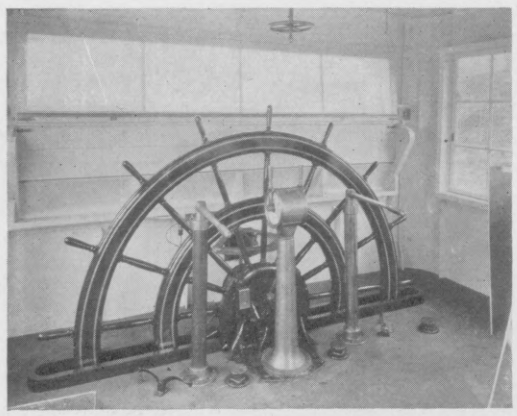
Ms. Benwood, Built and Designed by Dravo Co., Pittsburgh, Has Two F. M. Diesels of 480 Collective Hp. with Straight Shaft Drive

THE towboat BENWOOD is one of the latest additions to the rapid growing fleet of Diesel engined craft operating on the Western rivers.

Her machinery arrangement has many features worthy of note and she is one of the few boats in which the problem of the larger width of the stern wheel compared with the center to center width of the propelling engines has been overcome by inclining these latter at an angle to the center line. Furthermore the two 240 hp. Fairbanks-Morse Diesels are each direct connected to a section of the split stern wheel. This use of two Diesel engines, each engine driving its own wheel, offers considerable flexibility in operation and in maneuvering, and trial trips of the BENWOOD demonstrated that with the rudders in the hard over position and with one engine operating one wheel in one direction and the other engine operating its wheel in the reverse direction it was possible to carry out very rapid flanking. By rotating the wheels in opposite directions and with the rudders set in center position it was possible to "pivot" the boat in her own length. These unusual maneuvering characteristics are particularly important in all types of shallow draft work and under conditions met with on the Western rivers.

The two 240 hp. Diesels are set slightly on an angle with longitudinal axis of the towboat and are connected through air-oil operated clutches to 4⅞ in. drive shafts which are supported by ring oiling bearings. The sections of the shaft are connected together with DeLaval flexible couplings and the drive to the stern wheel is through a special unit type of reduction gear which has been developed and patented by the Dravo Co'.s Engineering Dept. who built the ship. This gear drive is interesting as it shows the great improvements which have been made in applying Diesel engines to river boat service—an expanding market.

Gradual and successful solution of the driving problem on Western river ships of which this is one very fine example, is one of the reasons why the Diesel engine with its great economy is being so rapidly adopted for river boat work. In this case the stern wheel drive consists of a bevel pinion which meshes with a bevel gear and



Main and standby steering

on the bevel gear shaft is a pinion which drives a large spur gear keyed to the shaft of the stern wheel. The total reduction is 1 to 12.4 which, with a rated engine speed of 250 r.p.m., gives a speed at the stern wheel of 20 r.p.m. Thus the reduction operation, although still comprising two reductions, is virtually combined in one. Many existing river boats still retain the two separate reductions.

Characteristics of Ms. Benwood

Length, molded	126 ft. 6 in.
Length o. a.	149 ft. 7 in.
Beam, molded	26 ft. 6 in.
Beam, extreme	27 ft. ½ in.
Camber of deck	0 ft. 6 in.
Depth mld. (amidships)	5 ft. 6 in.
Power (main engines)	480 b.hp.

The pinions are of forged, high carbon steel and are heat treated while the bevel gears of the two drives are carbon steel, forged and oil tempered. The large spur gears are of high carbon cast steel with cut teeth. All of the bearings in the stern wheel drive are Timken roller bearings arranged to take the radial and end thrust. The bearings supporting the stern wheel shaft are standard sleeve bearings. All these bearings are lubricated with an Alemite high pressure lubricator so that it is unnecessary to climb over the stern wheel to screw up grease cups. The center grease gun which lubricates all these bearings is located at the stern of the boat.

Another interesting detail in connection with the stern wheel construction is a pipe which connects with the circulating water system on the engine so that it is possible to discharge hot circulating water over the stern wheel in order to remove ice during winter operation.

In the engine room of the BENWOOD a centralized control panel is located just above the operating aisle between the two engines. This panel is equipped with two Brown electric tachometers which show the speed of the engine. There is also a pyrometer with its control switch mounted on the board. This control switch has eight points so that it is possible to read the operating temperatures of any of the cylinders of the two engines by this one indicator. A gauge for the starting air pressure is also provided as well as a clock and the two engine room telegraphs are also mounted on this board.

The two 240 hp. Diesel engines are equipped with built-in air compressors although these particular compressors are not standard compressors ordinarily furnished as a part of these engines. In this case the compressors are the 2-stage intercooled type with a capacity of 90 cu. ft. The air pressure carried is approximately

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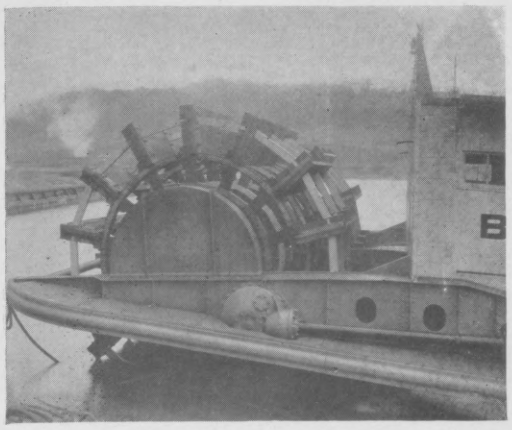


Sternwheel and drive

200 lb. The air supply is stored in three air tanks with a total capacity of 234 cu. ft. With the extra large compressors which are provided and the air tank capacity, BENWOOD can meet the most unusual maneuvering conditions with a certainty that ample supply of air will be available.

The exhaust from the main engines is handled in each case by a copper exhaust pipe which attaches to the exhaust manifold of the engine and passes up to a water base which forms the base of each stack. This water base cools and cleans the exhaust and also has some silencing effect. The auxiliary units also exhaust into these water bases.

There is an interesting detail connected with the Climax auxiliary gasoline engine units, these units, one of which is 60 hp. driving a 40 kw. generator and the other 24 hp. engine driving a 14 kw. generator, being radiator cooled. The explanation for this method of cooling is that these engines are frequently operated while the vessel is tied up at the wharf and it was desired to free the engineer from the necessity of looking after a circulating water system for the auxiliary units. The 24 hp. engine is also belt connected to a 4½ by 5 in. auxiliary compressor as an adjunct to the regular air starting equipment.

Fuel oil is carried in three hull compartments which are formed by two oil tight bulkheads and two dividing partitions which split the compartment into three sections. The total capacity is 9500 gallons which is sufficient for 30 days' normal operation.

Both the sanitary system and the bilge pump are air operated and the bilge pump connections are so arranged that any compartment can be pumped out.

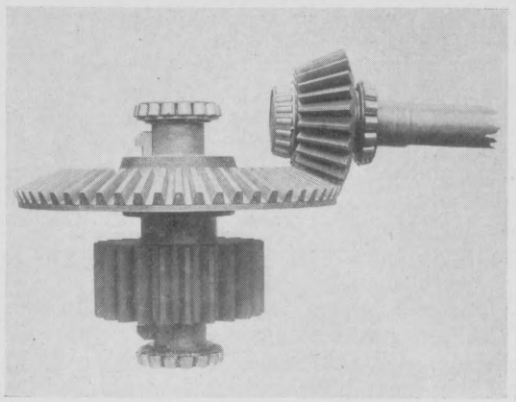
Complete motor driven capstan equipment is provided, the two forward capstans being driven by 25 hp. motors and the two side capstans with 15 hp. motors. All these motors are of the heavy duty crane type with resistance control and are equipped with Solenoid brakes. The type of motor used is similar to those on street cars.

The heating of the vessel is taken care of with a vacuum type vapor system using a Winchester Capital boiler.

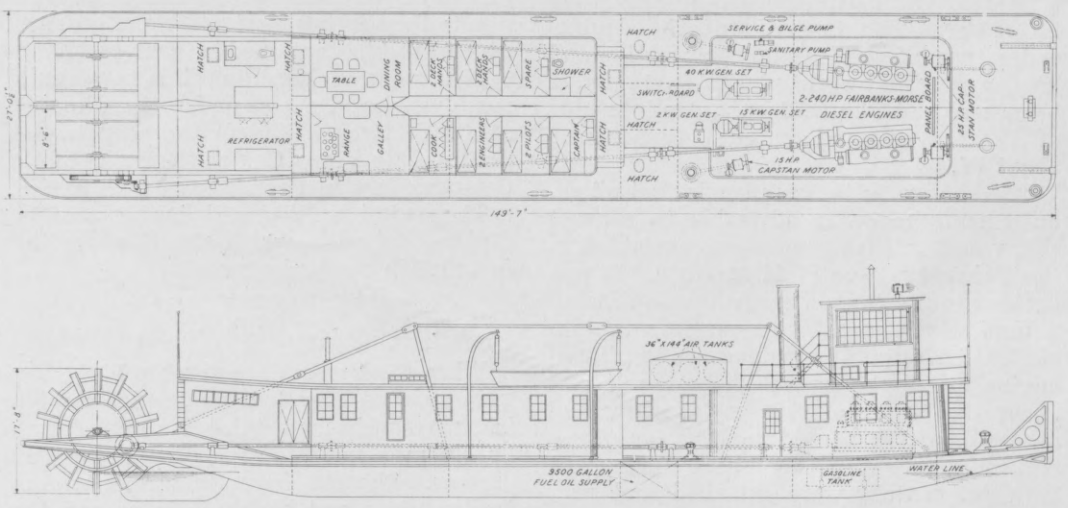
Directly behind the center of the large wheel in the pilot house is located a Cory double control engine room telegraph. Two steering columns are located on each side of the telegraph pedestal as shown.

A distinct improvement over the automatic wheel brake consists in mounting a V-groove steel brake rim directly on the hub of the pilot wheel. The linkage arrangement from the levers on the steering columns operate this automatic brake through contacts by double pivioted V-type asbestos metallic blocks.

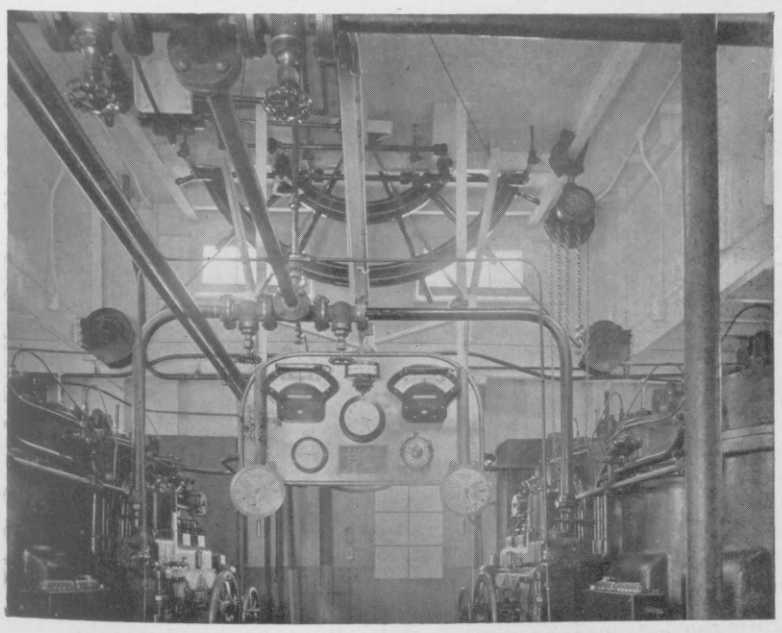
Through a linkage arrangement the two levers on the steering columns not only control the opening of the air valve which admits air to the Western river ram type steering engine but also release the brakes which lock the wheel. Four foot pedals have also been provided, as shown in the view of the pilot house, which are automatically raised as soon as either of the steering levers are thrown into a position where the valve which admits air to the steering engine is opened. Two of these foot pedals are located near the side windows and so it is easy for the pilot to stop the movement of the rudders by stepping on the foot pedal which is next to him. When any one of these four foot pedals is depressed the air supply to the steering engine is cut off and the brake is applied to the wheel. As long as the steering levers are in the operating position the steering engine continues to move the rudders over unless stopped as mentioned. A tiller indicator operated



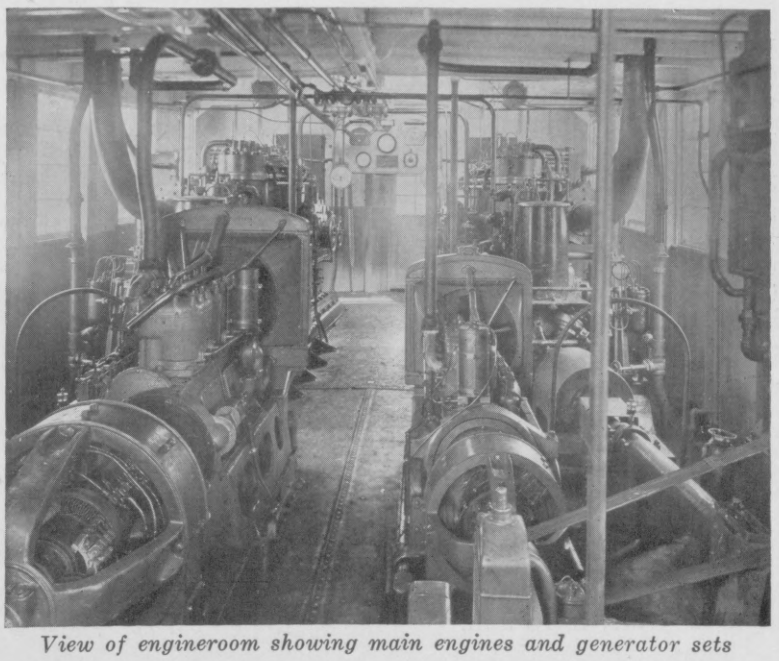
Details of sternwheel drive



Arrangement of hull and machinery on Diesel-sternwheeler Benwood



Control board and underside of auxiliary steering wheel



View of engineroom showing main engines and generator sets

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from the wheel drum shows the course of the vessel.

The balanced rudders are built of 3¾ in. white oak securely drift bolted together and reinforced with plates and bars. The rudders also have a fin plate about 24 in. wide at the aft end tapering to the width of the angles at the rudder stock. The rudder trunks are 9 in. extra heavy pipe and both the lower and upper bearings are bronze bushed.

There are also two foot pedals in the pilot house which control a triple gong air whistle. On the roof of the pilot house is a 19 in. searchlight which is controlled by a hand wheel just above the pilot's head. With this control it is possible to swing this searchlight both vertically and horizontally so that the beam can be focused at any point desired.

The layout of MS. BENWOOD shows that considerable thought has also been given to the comforts of the crew. The quarters are well arranged and include six rooms and bath room. The complete equipment of the galley includes a Kelvinator refigerating unit. Current for operating the refrigerator is supplied by a 2000 watt Kohler generating set located in the engine room. This refrigerator generating set is connected to the circuit connecting the night lights. Whenever the thermostatic switch on the refigerating unit closes or when one of the night lights is turned on the set starts up automatically. The flooring in the quarters is covered with 3/16 in. battleship linoleum laid with cement.

The complete design of MS. BENWOOD was developed by the Dravo Contracting Company. F. R. Dravo is President of the Dravo organization, V. B. Edwards, Vice President and General Manager, and R. N. Coolidge is Assistant General Manager. The vessel has been built for the Wheeling Steel Corp., Wheeling, W. Va.

Conversion of the Ferry Golden City

THE largest single unit Diesel engine in a San Francisco Bay ferryboat is installed in the Golden Gate automobile ferry, GOLDEN CITY. This boat previously called the ALVIN J. HANFORD, was driven by a reciprocating steam engine removed from the U. S. Destroyer FARRAGUT. The ferry is of the double-ended type, of wooden hull construction and has an overall length of 176 ft. 10 in., a beam molded of 30 ft. 6 in., a depth molded of 12 ft. 8 in. and an auto. capacity of about 50.

The change in the company's fuel oil requirements made it advisable to convert this vessel to Diesel power, as explained in the February issue of MOTORSHIP. It was decided to use the old shaft line and install a unit which would accommodate the installed shafting. The bedplate of the Diesel engine raised the center of the crankshaft above the center of the line shafting and necessitated the use of gearing for power transmission. Herring bone gears at 18⅝ in. centers were installed and provided a reduction in speed from 200 r.p.m. on the engine to 161 r.p.m. on the propellers.

Engine Characteristics of Ms. Golden City

Bore	17 in.
Stroke	24 in.
Overall length of engine	21 ft. 6 in.
Overall height from center of crankshaft	9 ft. 9⅜ in.
Approximate total weight	80 tons

The main unit—a 6-cylinder, 600 b.hp. Washington-Estep Diesel Engine, built by the Washington Iron Works of Seattle—operates continuously in one direction and is provided with cone clutches on each end of the crankshaft. One tail shaft is provided with a right-hand propeller and the tail shaft on the opposite end rotates a left-hand propeller. The aft propeller drives the ship, while the forward propeller idles. Maneuvering is accomplished by engaging the desired clutches. Backing is taken care of by engaging the clutch on the forward end of the engine in the relative direction in which the ship is operating. When the ship is backing, the aft screw idles. "Filling" is accomplished by disengaging the forward clutch and immediately thereafter engaging the after clutch. Both clutches are controlled by a single handwheel. The overall length of unit from flange to flange, including clutches and herring bone gears, 45 ft. 9 in.

The steam auxiliaries are completely removed and modern equipment installed. An oversize air compressor is provided on the main engine for charging the starting tanks, as well as for supplying air for the steering engine. Forced feed lubricating pumps of excess capacity provide lubrication to the herring bone gears and bearings which are self-contained in gear cases.

The work of installing the new equipment was carried out under the direction of C. C. Brown, Chief Engineer of the Golden Gate Ferry Co., at the docks of the Company in San Francisco.

The vessel is intended to be used on night relief runs, which should prove this installation very economical.

Completes 22,000 Mile Voyage

When the Roosevelt motorship WEST COSETTA reached Pier 4 Army Base, Brooklyn, last month she had finished successfully a 22,000 mile maiden voyage with complete success. She ran from New York to Australian ports and back. It is proposed to give a detailed account of the voyage in our next issue.

Coastwise Motortanker Tydol

MS. TYDOL is the latest of a series of Diesel driven coastwise tank ships constructed by the Sun Sb. Co., Chester, Pa. The new ship has a total capacity of 742,500 gal. and her hull is more or less of conventional form, being very similar to that of MS. SUNOCO described in a recent issue of MOTORSHIP. Tidewater Oil Co. are the owners of MS. TYDOL. They are employing her in coastwise trade all the way from Norfolk, Va., to Eastport, Me., carrying gasoline and they expect to use her also on the New York State Barge Canal.

Powered by Winton Diesels and with a complete outfit of Northern Rotary pumps, including three cargo pumps driven by 50 hp. motors, the new ship represents a fine addition to coastwise transportation facilities. She has an overall length of 260 ft. 10¼ in., a beam of 40 ft. and a depth of 14 ft.

New Motorship in Pacific Trade

Six hundred and fifty visitors inspected the motorship FELTRE upon her arrival in San Francisco after completion of her maiden voyage in the trade between the Mediterranean and North Pacific ports, according to announcement of the General Steamship Corporation, Pacific Coast agents, representing the Navigazione Libera Triestina, S. A., Trieste, Italy, owners of the vessel.

The FELTRE is one of six of a similar type, especially built for this trade. She is equipped to carry 36 passengers with an attractive smoking-room and social hall. She has a cargo capacity of 10,500 tons d. w. and is equipped to handle 350 tons under refrigeration. The power plant of the vessel consists of a 6-cylinder B. and W. Diesel of 3,200 i. hp. During builder's trials the FELTRE attained a maximum speed of 14.20 knots and an average speed of 12.82 knots. She is under command of Captain L. Rismondo, former chief officer of the LEME, a sister ship in this trade.

The direct service between the Pacific Coast ports and the Mediterranean afforded by this line has been operated approximately 18 months.

Ms. Tydol, a 742,500 gal. capacity coastwise oil ship now in service

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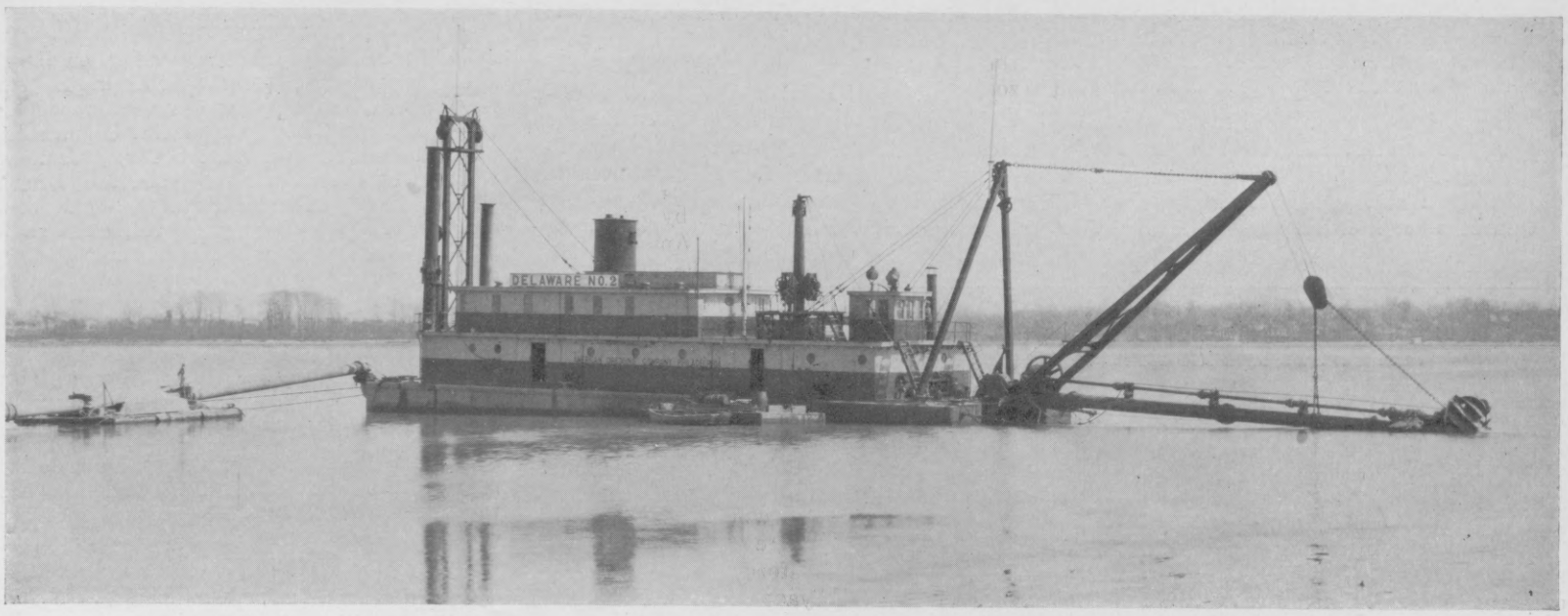


New Diesel Dredge Has Quill Shaft Drive

A 20-in. Pipeline Dredge Designed to Work in Narrow Channels Powered by an 800 hp. Winton with Special Drive

DREDGE Delaware No. 2 was designed to work in locations where channels are narrow and bridge openings restricted. She is a pipe line dredge with rather a novel form of quill shaft drive. The hull proper is heavily built, and is strengthened transversely by belt frames and longitudinally by two trusses with plate and angle top and bottom members and angle iron diagonals. The main house is 87 ft. long by 24 ft. wide and 7 ft. 9 in. high, and contains the deck machinery with galley messroom and refrigerator room at the after end.

The spuds, two in number, are welded steel tubes 25½ in. diameter by 55 ft. long with cast steel points. The tubes are forced over fir spars 24 in. in diameter. Spud mast, "A" frame, and boom are all of steel "H" section strongly braced, with angle iron latticed bracings.

Characteristics of Dredge Delaware No. 2

Length overall molded	110 ft. 0 in.
Beam molded	31 ft. 10 in.
Depth molded at side	10 ft. 0 in.
Thickness of deck	0 ft. 4 in.
Builders	Sun Sb. Co.

The main dredge pump has 20 in. diameter suction and discharge with a 78 in. runner and is directly connected through a quill shaft, having two flywheels to an 800 b.hp. Winton Diesel.

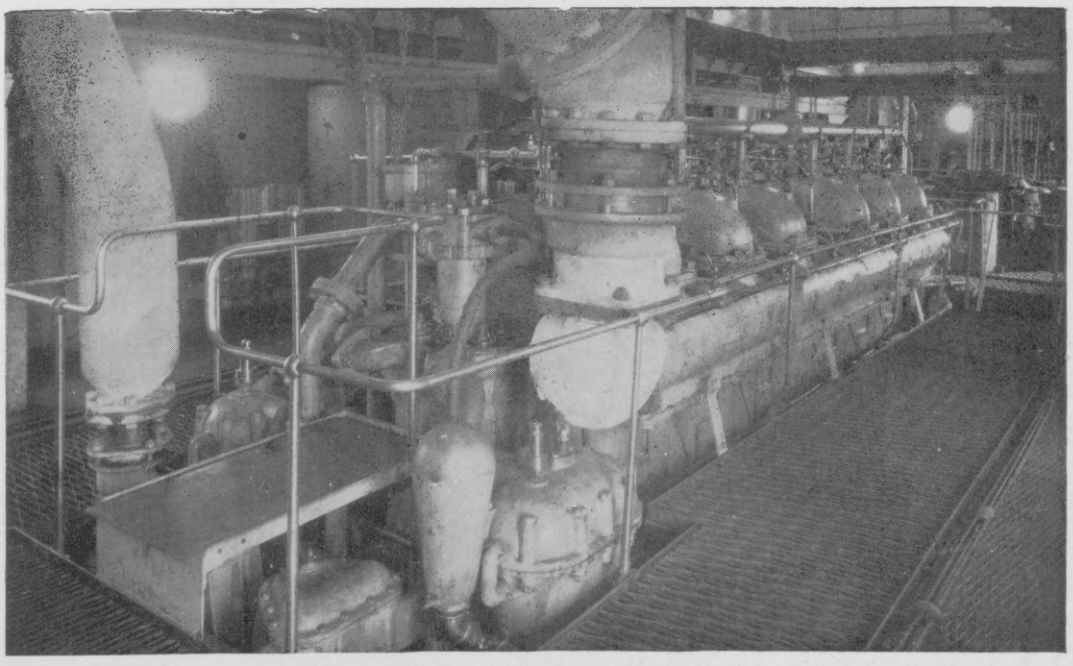
Special attention has been given to the elimination of torsional vibration, and, under test, vibration was practically non existent through the range of operating speeds.

The suction pipe lifting and hauling gear and the spud hoist are operated by a 5-drum winch driven by a 70 hp. motor.

The main generator is a 220 b.hp. Winton Diesel directly connected to a 150 kw. generator. There are two bilge pumps, one service pump and one deck pump. There is also an electric capstan, American Engineering Company's make, with Westinghouse motor.

The cutterhead motor is a 60 hp. Westinghouse motor totally enclosed and weatherproof, having a 6-point drum control, with a 50 per cent speed reduction control in lever house. The usual oil filters and motor driven oil service pumps of Winton make are installed. The suction pipe and cutter gear are of the American Dredging Company's patent, and there is a swinging frame which permits the operator to swing the suction pipe independently of the dredge. Alternately, by securing the suction pipe to the hull, he can swing the dredge in the usual manner on the spuds. All oil and water tanks are built into the hull structure and the capacities are as follow:

Pipeline and cutter head



Main engine room of the Diesel dredge Delaware No. 2

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Fuel oil	30,000 gal.
Fresh water	2,500 gal.
Engine circulating water	5,000 gal.
Trimming tank	15,000 gal.

The spud wells are built into the vessel and are formed of cast steel top and bottom, the castings being secured to a steel tube riveted and welded to castings.

Quarters are fitted up with metallic berths and the ship is steam-heated throughout with an oil-fired auxiliary boiler.

The galley has a coal range and has a refrigerator fitted with a Frigidaire unit.

The vessel was built by the Sun Sb. Co., Chester, Pa., for the American Dredging Co., Philadelphia, and her construction was supervised by Cornell and Matthews, marine engineers, Philadelphia. Her equipment is of most modern type.

Vincent Astor's New Motoryacht

THE new motoryacht now under construction for Vice-Commodore Vincent Astor has been designed by Theodore E. Ferris in association with Cox & Stevens. The ship is essentially a heavily built, substantial, seagoing craft of rugged design, having the appearance more of a special type of naval vessel than of the conventional yacht.

The new motoryacht, which is of very large size, as the dimensions given below will show, has unusual freeboard, a straight and slightly raking stem, cruiser stern, machinery and stack being located amidships. Two large pole masts are to be used for signalling purposes.

Characteristics of the New Astor Motoryacht

Length overall	263 ft. 10 in.
Length on waterline	260 ft. 0 in.
Beam molded	41 ft. 6 in.
Mean load draft	16 ft. 0 in.

The hull is being built at Krupp's Germaniawerft Kiel and the machinery consists of two Sulzer Diesels of sufficient power to give the yacht a sustained speed of 15½ knots. Fuel, water and stores can be carried sufficient for extended ocean voyages, and the whole conception of the design is to produce a vessel specially adapted for off shore work, while at the same time most comfortable for cruising along the American seaboard as necessary.

Full advantage has been taken of the possibilities afforded by the large dimensions of the yacht to lay out most comfortable quarters. Three large cabins each with bath for the owner and guests are placed on the main deck.

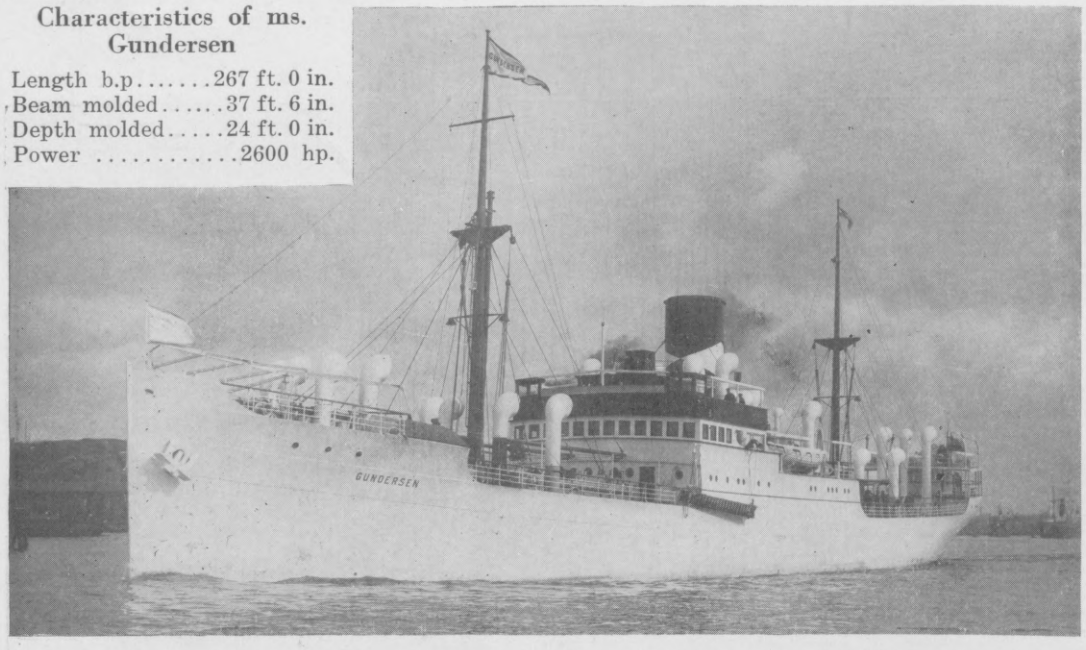
Motorship for New Zealand

Trials have been carried out with the twin-screw motorship SOUTHLAND, constructed by the Dublin Dockyard Company, Ireland, for the Bluff Harbour Board, New Zealand. SOUTHLAND is 143 ft. in length overall, 30 ft. in breadth, 12 ft. 6 in. in depth from the main deck and 20 ft. in depth from the upper deck, and has been designed for use as a tug and pilot vessel, a salvage vessel, or an excursion steamer. She has accommodation for 285 deck passengers. Her propelling machinery, constructed and installed by Petters (Ipswich), Ltd., Ipswich, is the highest-powered set of its type yet fitted in a vessel. It consists of Vickers-Petter twin 6-cylinder heavy-oil engines capable of developing a total b.hp. of 1,200 at 270 r.p.m. Similar machinery is to be installed in another vessel which the Dublin Dockyard Company are building—a twin-screw insulated and passenger boat for the New Zealand Government Pacific Island Administration.

Diesel "Fruit Boat" on Schedule from New York to Carribbean

Characteristics of ms. Gundersen

Length b.p.	267 ft. 0 in.
Beam molded	37 ft. 6 in.
Depth molded	24 ft. 0 in.
Power	2600 hp.



Ms. GUNDERSEN left New York on May 11 on her maiden voyage to Port Antonio, Jamaica, B. W. I., to load bananas for Boston, where she was scheduled to arrive on May 23. She has been built by Götaverken, Gothenburg, and is under long term charter to United Fruit Co. Two 6-cylinder 1300 hp. Götaverken-B. & W. Diesels give her a 14-knot speed.

Personal

John F. Metten, previously chief engineer, now vice-president, of the Wm. Cramp Ship & Engine Co., Philadelphia, has been appointed vice-president in charge of marine engineering for American Brown Boveri Corp., Camden, N. J. This combines in American Brown Boveri the engineering knowledge and constructional skill of two great American shipbuilding companies and assures a satisfactory operating organization to carry out work in hand and in prospect.

R. B. Lea has been appointed assistant sales manager of the Sperry Gyroscope Company. He will also continue as manager of the marine department. Mr. Lea became associated with the Sperry company immediately after leaving Cornell in 1915 and has had experience in nearly all departments of the company. He has a large acquaintance among marine people throughout the world.

H. W. Marshall has joined The American Hammered Piston Ring Company, of Baltimore, Md., which has enlarged its sales organization. Mr. H. W. Marshall was formerly with The Anderson Company, of Gary, Indiana. His territory will include Kansas, Oklahoma, Arkansas, and part of Missouri.

Dwight W. Morrow, of J. P. Morgan and Company, and Victor M. Cutter, president of the United Fruit Company, were elected directors of the Internation General Electric Company at a recent meeting of the board.

Catalogs

Diesel-electric Drive for Towboats is the title of a comprehensive booklet issued by the General Electric Co., Schenectady, N. Y. It is illustrated with pictures of recent noteworthy electric tugs and shows the advantages to be obtained from Diesel-electric propulsion.

Manzel Force Feed Lubricators is the title of a new booklet describing the Manzel Model 82 Diesel engine lubricator. The book is profusely illustrated and may be obtained from Manzel Bros Co., Babcock street, Buffalo; N. Y. N. Y.

The B. F. Goodrich Rubber Company have sent us a well produced and illustrated book entitled "Cutless Rubber Bearings for Marine Transportation." This booklet features the various classes of ships to which Cutless Bearings have been applied.

Classified Advertisements

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